THE MONTHLY

Review

OCTOBER · · · 1947

Just off the Press

This New 48 page Book of Information for the Electroplating Industry INCLUDES a 15 page Supplement on PLATING SOLUTION ANALYSIS.

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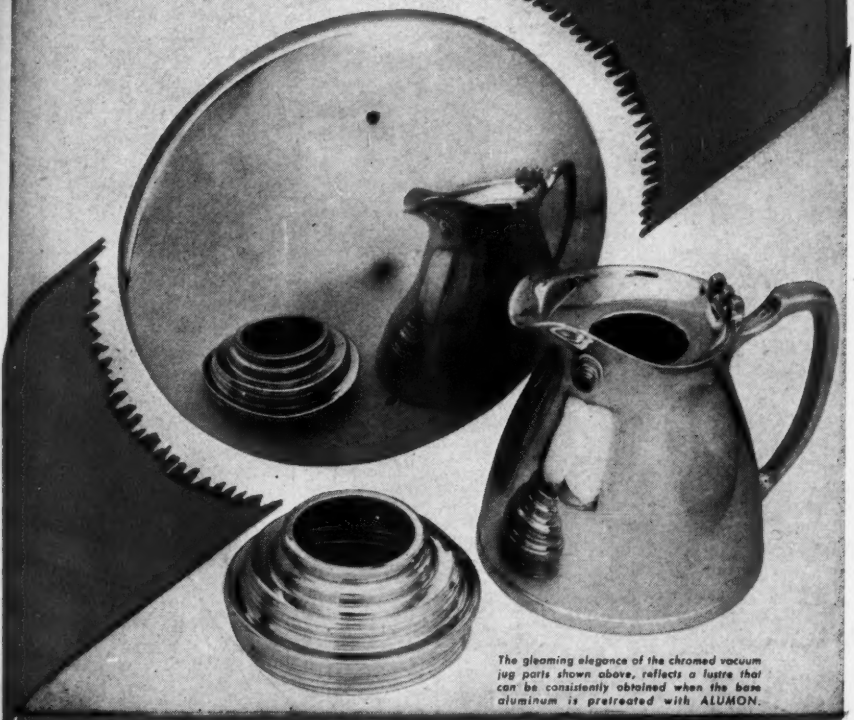

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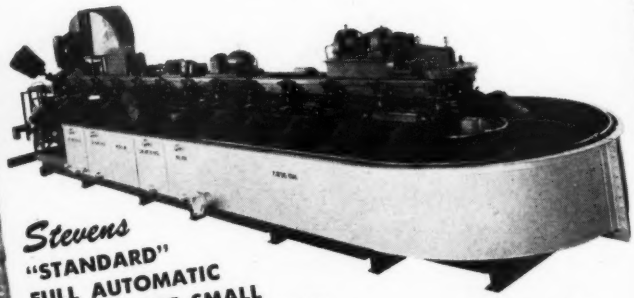

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THE MONTHLY

Review

VOLUME 34 OCTOBER, 1947 NUMBER 10

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Published monthly at 5800 N. Mervine Street, Philadelphia 41, Pa. Official Organ of the American Electroplaters' Society. Executive Offices: P. O. Box 168, Jenkintown, Pa. Phone: Ogontz 4663. **Subscriptions:** Domestic and Canada, $3.00 per year, 50c per copy. Foreign, $4.50 per year, 75c per copy. Entered as second class matter July 1, 1946, at the Post Office at Philadelphia, Pa., under Act of August 24, 1912. Copyright 1947 by American Electroplaters' Society, Inc.

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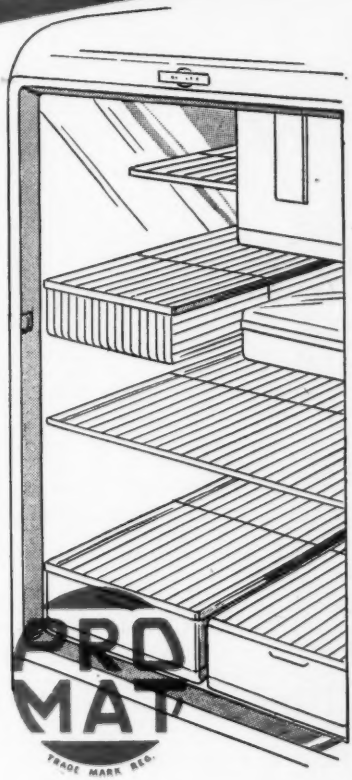

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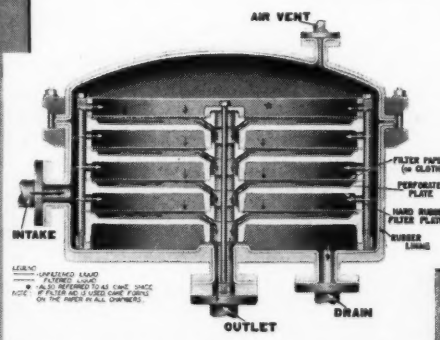

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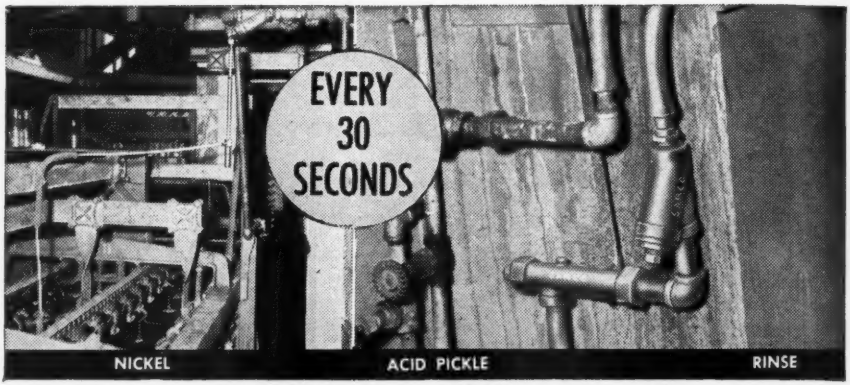
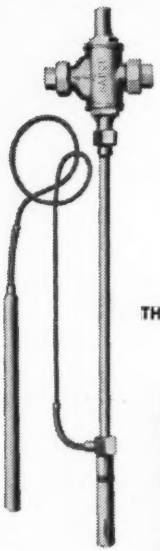


A Perfect Plating Operation



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THERMOTON

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4. Bright nickel plates directly on fine grained copper deposits, secured by deposition or coloring.

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6. Perfect adherence to properly cleaned base metals even with very thin deposits.

7. Seymour bright nickel plated articles are often chromium plated without removal from original rack.

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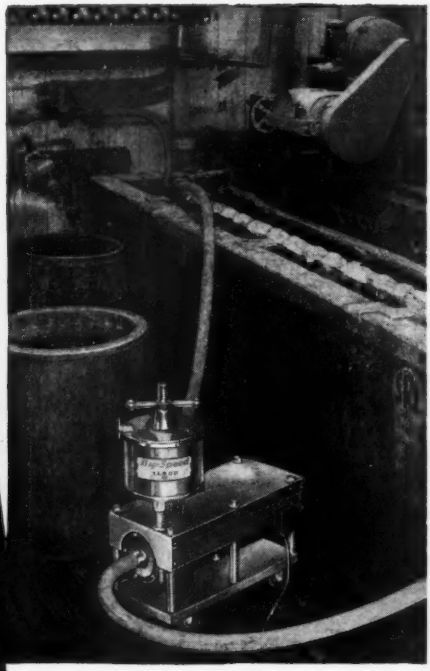

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Write for your copy of P-347 which tells exactly how, why and where "*Sealed-Disc*" Filters can help you get finer finished plated work from your plating solutions.

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Filters, Filter Discs, Pumps, Tanks, Mixers, Agitators

THE MONTHLY
Review

EDITORIAL

A. E. S. MEMBERSHIP DRIVE

The American Electroplaters' Society started some thirty-five years ago and ever since has traveled in one direction only—forward. The growth of the Society was slow and steady at first, the membership reaching 2,187 by April 30, 1940. At this point the thirty years of plugging the Society to industry, educational institutions, etc., really started manifesting itself. From the 2,187 figure of April, 1940, we jumped to 4,842 by April, 1947, an increase of 121.4 per cent.

This looks like a phenomenal increase, but in reality we have only begun to sign up the thousands directly connected with the many phases of metal finishing. Much help is needed to do this. The A. E. S. Constitution designates the Second Vice-President as National Membership Chairman and a Vice-President of each Branch as Branch Membership Chairman. This makes a total of forty-one people constitutionally selected to promote the membership growth. As your National Membership Chairman this year, *I hereby* appoint every member of the A. E. S. to a place on the committee and *charge each member to bring in one new member.* This simple assignment would double our present membership.

Let us review what we have for selling points in obtaining these new members:

There are local Branches in all large cities and industrial areas, with monthly meetings to which a troubled man may bring his finishing problems. At these meetings he will meet suppliers, fellow workers, technicians, etc., for business and social contacts. Most of the Branches hold annual regional meetings. Our National Convention has become more effective and far reaching with every year: Detroit had 1,700 registrants, a new

high, and the Exposition, the largest finishing show ever attempted, attracted approximately 38,000. The A. E. S. member receives the REVIEW, our monthly publication, as well as the *Proceedings* of the educational sessions of the Convention at no extra charge. We have a Research Program in which are engaged the best technical minds in the industry, all A. E. S. members, working in conjunction with leading American universities. The results of this intensive program, the envy of every Technical Society, are available to A. E. S. members at no cost. Dr. Wick, the Research Committee Chairman, is soon to initiate a procedure whereby highly technical research findings will be put into simple language for the benefit of the everyday working member. Many of the Branches, in conjunction with conveniently situated schools and universities, operate evening classes to co-ordinate technical knowledge with our everyday practical functions.

Truly, the education furnished by the A. E. S. has served well as a substitute for a college degree for so many of us who started careers without the proper academic background.

In this day and age of inflation, *there is only one item left on the bargain counter—a membership in the A.E.S.*

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JETAL goes on fast, but it stays on. **JETAL** is better because it does more and costs less.

JETAL is a black oxide coating that is easily and inexpensively applied by immersion in less than 5 minutes.

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JETAL will not chip, peel, crack, crumble or dust off, even on bending or cutting.

JETAL forms a fine base for lacquer, enamel or japan.

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JETOIL 1A effectively guards against rust. As a supplemental oil film after JETAL coating, it protects during assembly, inspection, storage or in service. rust is not apparent until after more than 50 hours salt spray testing.

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Oxidine B — for blackening copper and brass.

Oxidine Z — for blackening zinc.

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Bon White — an immersion tin finish for copper, brass or aluminum — exceptionally bright white — ideal soldering base.

Wite Brass plates a tertiary alloy of copper, zinc and tin, giving brilliant, non-tarnishing, long-wearing surface over all base or precious metals.

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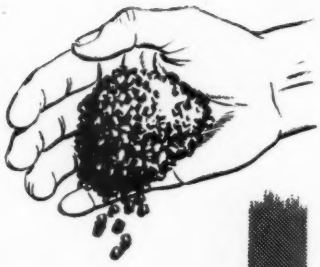
"Tops"



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These SMALL, PERFECT CRYSTALS are superior to large crystals, giving you many advantages. McGEAN NICKEL SULPHATE is:

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- HIGH IN PURITY
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IMMEDIATE DELIVERY
PACKED IN 100 LB. BAGS

The McGEAN CHEMICAL COMPANY
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MECHANICAL PROPERTIES OF NICKEL DEPOSITS

E. J. ROEHL

Research Chemist, The International Nickel Company, Inc.
Research Laboratory, Bayonne, N. J.

As the fields for application of electroplating expand, it becomes increasingly important that the plater be in a position to produce electrodeposits of mechanical properties—ductility, strength, hardness—which will meet the specifications of the design engineer. Mechanical properties of deposits from the hard nickel bath are available[1] as well as preliminary data for Watts bath deposits[2] and for chloride nickel bath deposits[3]. The most complete available data[4] are for deposits from baths the compositions of which are not comparable with those of present-day rapid nickel plating solutions.

A program has been initiated to supply data for the all-chloride bath and a typical Watts bath of the compositions set forth in Table I. The present paper furnishes data

TABLE I
Solution Compositions

Constituents	Watts g/l	Chloride g/l
Nickel sulfate	325	.....
Nickel chloride	45	300
Boric acid	30	30
Nickel	79.3	75.1
Chloride	13.4	89.5

on hardness, ductility and tensile strength as they are affected by the following variables: *p*H, solution temperature, current density, and annealing temperature and time. In a subsequent paper data will be given for variations in bath composition.

Experimental

Ten liters of each solution were prepared from CP salts and purified by treatment with activated carbon, with an excess of hydrogen peroxide, by oxidation at high *p*H and finally by working at 2, 5 and 50 asf. The solutions were held in glass jars, and their *p*H were maintained at ± 0.05 units of the indicated values by regular additions of acid; all *p*H values are on the electrometric scale. Anodes were bagged, and the solutions were filtered frequently.

A number of experimental procedures were considered, tried and discarded. The one finally adopted was to prepare 0.03 inch thick deposits on both sides of a 6 x 2½ x 0.03 inch stainless steel cathode. When the edges were sheared or ground, the two deposits fell from the cathode; four sheet tensile specimens were machined from the nickel deposited in each run, each 6 x ½ inch with a 1½ x ¼ inch reduced section. These deposits are thick enough that the ductility is independent of their thickness and that hardness numbers and tensile strength values can be obtained. Five half-inch gauge marks were made, the width and thickness of the specimens measured at each mark, and the appropriate values used in calculating the tensile strength. Vickers hardness numbers were obtained on each specimen before machining and after annealing on both the basis metal side and the outside of the specimens; the reported values are for the outer surface of the deposit. Annealing was carried out in a

hydrogen atmosphere after thorough degreasing of the specimens. Runs were made at intervals in the Watts solution at a *p*H of 2.0 to check its condition.

At the start of each run there was added to the Watts solution 0.4 ml of 30 per cent hydrogen peroxide for *p*H 1.0 through 4.0 and 0.25 ml for *p*H 4.5 through 5.3. For the chloride solution, 0.3 ml was used.

Results

The results of the mechanical tests are given in Table II and a series of graphs shown as Figs. 1–7, those of the microscopic studies in Figs. 8–16.

Mechanical Properties

In general the hardness, elongation and tensile strength values of both the as-plated and annealed deposits are quite well correlated, the elongation varying inversely with the other two properties. Gardam and Macnaughtan[4], who made a study similar to the present one but with different solution compositions, obtained a similar relationship between the three properties; they also found a critical *p*H value above which the hardness increased rapidly and a maximum for the elongation value, both of which are indicated in Fig. 1 pertaining to the present work. In this figure the value of

TABLE II
Effect of Variables in Watts Solution on Properties of the Coating

pH	Temp. ° F	Current Density asf	Tensile Strength psi	Vickers Hardness Number 10	Per cent Elongation in 1 inch	Per cent Elongation in 1½ inch
				As Plated		
1.0	170	50	68,250	148	23.5	20
				Annealed, 15 minutes at 1400°F		
1.0	170	50	51,500	63	51	47.5
2.0	170	50	50,250	62.3	52	49
2.0	85	30	55,000	67.1	50	44
5.0	170	40	43,000	69.9	49	45
5.0	85	25	48,500	85.5	50	46

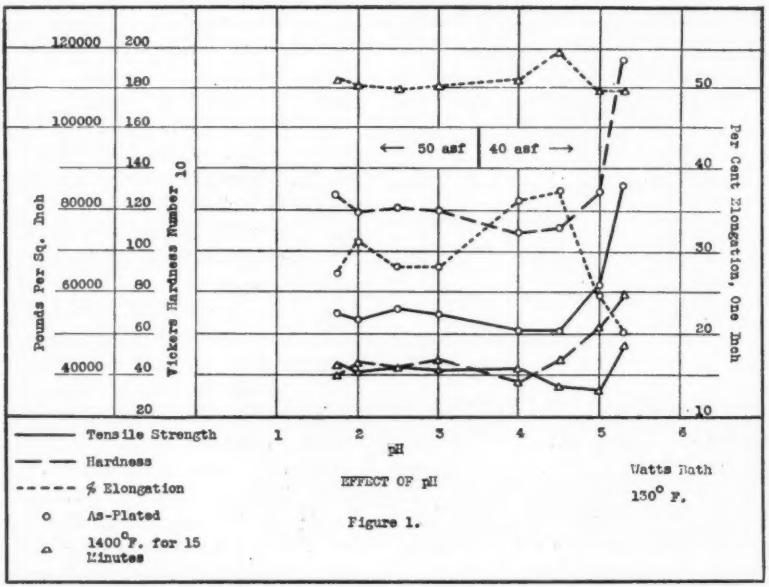


Figure 1.

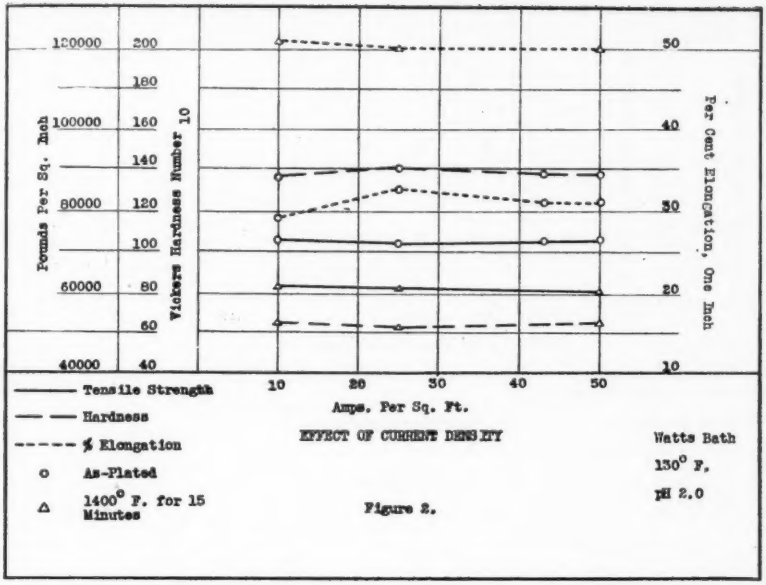


Figure 2.

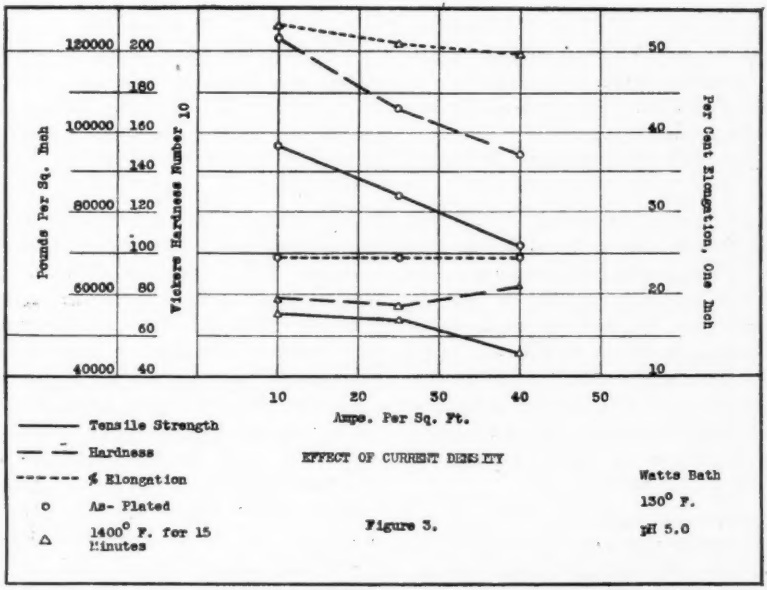


Figure 3.

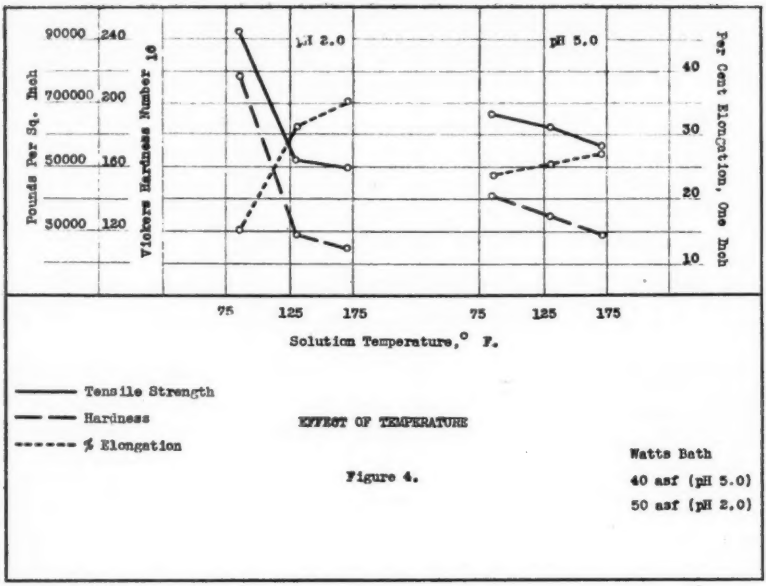


Figure 4.

37.3 per cent at *p*H 4.5 represents the maximum elongation obtained for as-plated deposits; the annealed coatings deposited under the same conditions showed the maximum elongation, 54.6 per cent, found under any conditions.

With the Watts solution at *p*H 2.0 (Fig. 2), the current density has practically no effect on the mechanical properties in the range investigated. At *p*H 5.0 (Fig. 3), however, while the ductility remains constant throughout the current density range, both hardness and tensile strength increase with decrease in current density. A hardness increase with decrease in current density is not what would be anticipated, but repeated runs checked the results.

Fig. 4 shows the influence of solution temperature on the properties of as-plated deposits; the hardness and tensile strength decrease and the ductility increases with increase in temperature. The effect is more pronounced at low than at high *p*H, and the highest hardness and tensile strength values were found in the deposits obtained from the low *p*H solution at 85° F. The results of annealing of deposits produced at several solution temperatures are given in Table II.

In Fig. 5 are given the effects of annealing temperature and time for the low *p*H solution. With a 15-minute anneal, the ductility passes through a maximum between 1300° and 1500° F; with a ten-hour anneal, the maximum ductility is approximately the same but occurs at a lower temperature. The hardness and tensile strength values show a steady decrease. The results of a 15-minute anneal for deposits prepared at the high *p*H are given in Fig. 6. A point of interest in both Figs. 5 and 6 is that overannealing will cause a marked loss in ductility.

Except when the *p*H is 4.5, *p*H, temperature and current density apparently have little effect on the maximum obtainable

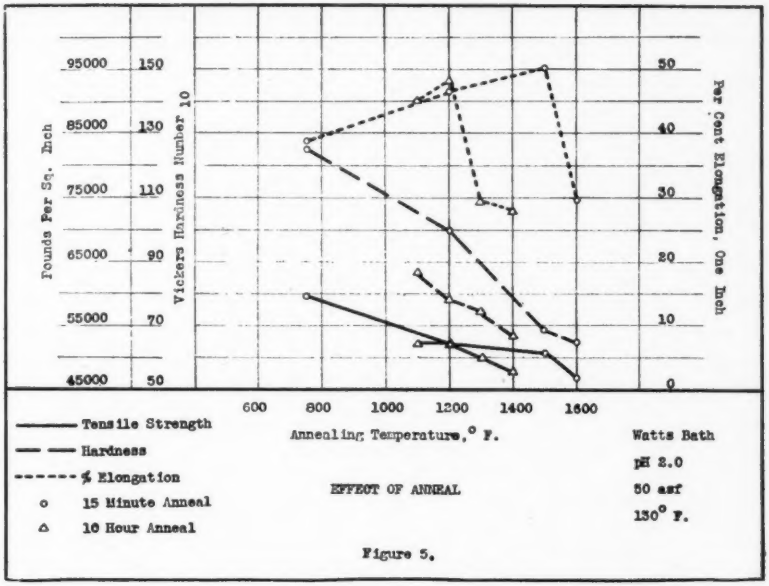


Figure 5.

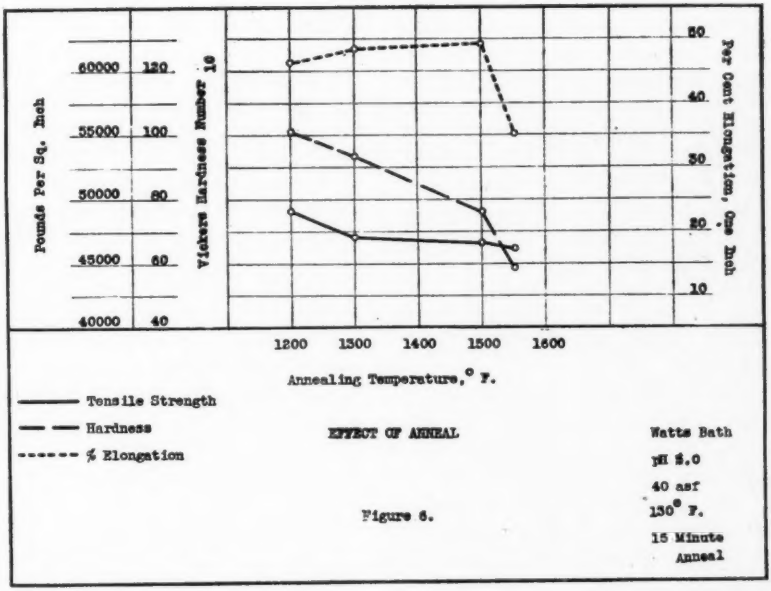


Figure 6.

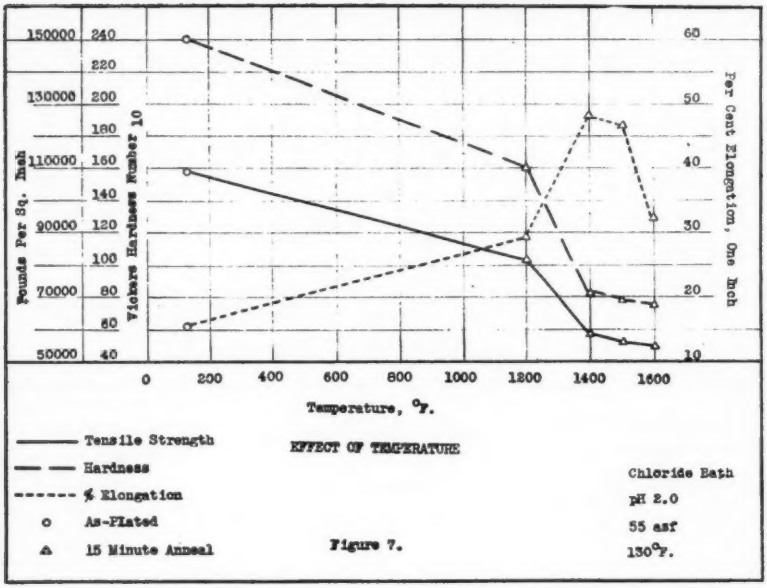


Figure 7.

elongation of the annealed deposits, a value of about 50 per cent being found throughout. It is interesting to note that Martin[5], who used a Watts solution of similar composition, found a minimum internal stress under otherwise constant conditions at *p*H 4–4.5, and that in the present work a hardness minimum appeared in the same *p*H range. There may be a correlation of these properties with the ductility varying inversely with the hardness and internal stress; the common factor may be the presence of a minimum of colloidal material in the deposit in this *p*H range.

As was known from previous work, as-plated deposits from the all-chloride solution (Fig. 7) are less ductile, harder and stronger than those from the Watts solution. Annealing for 15 minutes causes the elongation to pass through a maximum of about 50 per cent at 1400° F, values which correspond to those found for deposits from the Watts solution.

In case of the as-plated deposits, the surface in contact with the cathode was invariably harder than the outer or last-formed surface, but the difference was less (about 20 Vickers units) at low than at high *p*H (about 37 units). Gardam and Macnaughtan[4] noted the same effect on deposits prepared at low but not at high *p*H. These hardness differences are probably due to the gradual increase in grain size as the deposit grows in thickness which can be seen in several of the accompanying photographs. After annealing, the inside surface remained harder than the outer surface but the difference was considerably less, about 7 Vickers units.

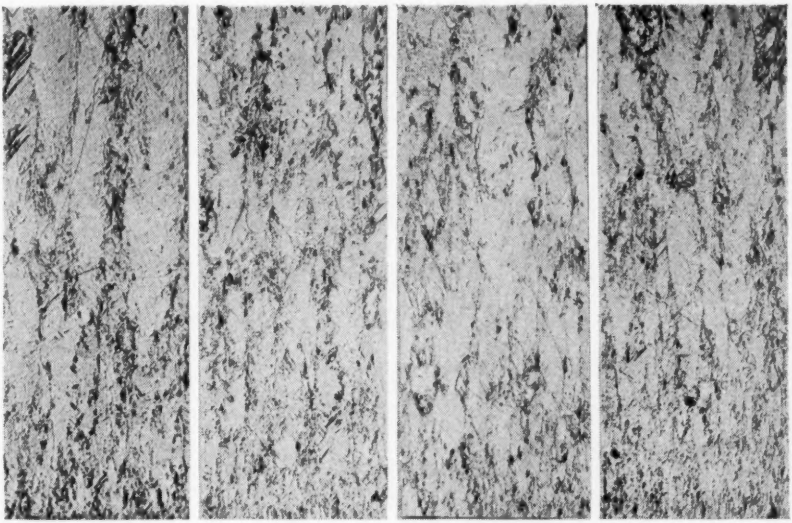
To check the operation of the Watts solution seven runs were made at intervals at *p*H 2.0; standard deviations have been calculated for the results obtained.

	Average	Standard Deviation
Tensile strength, psi.	62,800	1500
Hardness number....	137.3	0.8
Elongation in 1 inch, per cent	31	1.05

Microstructures

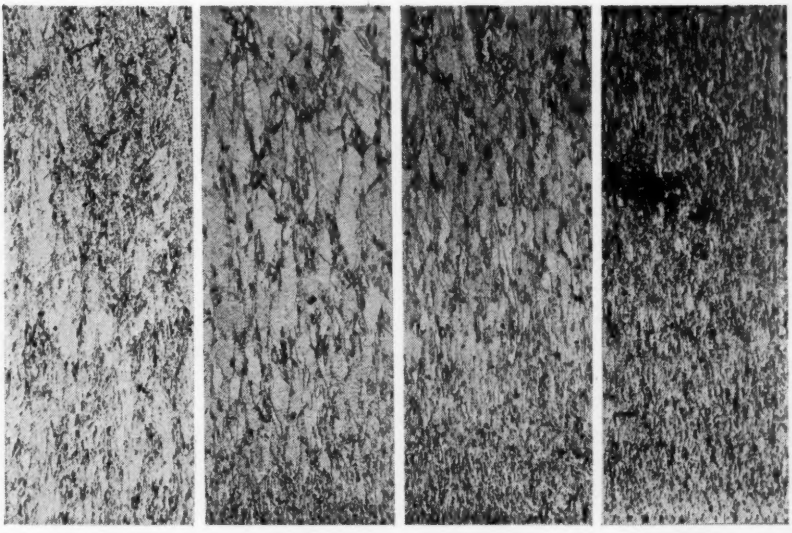
In the accompanying photomicrographs the basis metal side of the deposit is toward the bottom of the page.

Figs. 8a and 8b show the influence of solution *p*H on deposit structure: a gradual grain refinement as the *p*H increases. Annealing recrystallized these deposits into



pH 1.75 pH 2.0 pH 2.5 pH 3.0

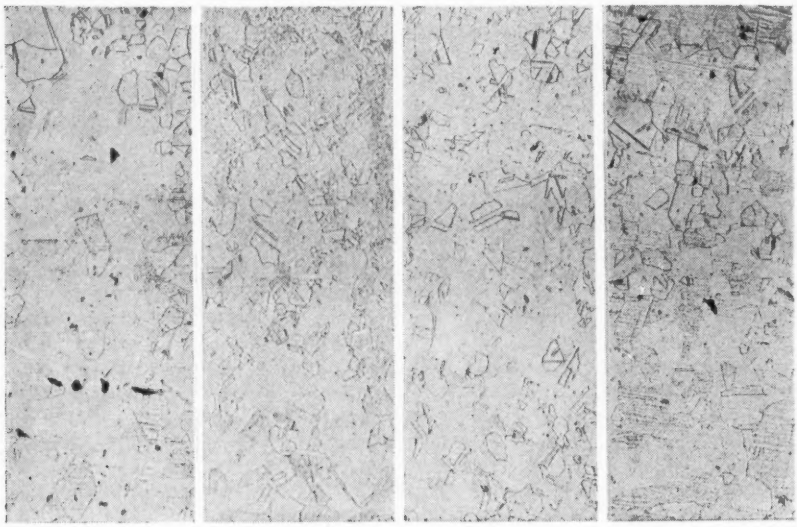
Fig. 8a. Effect of pH on structure of nickel deposited in a Watts type bath at 130° F and 50 asf. 100 X



pH 4.0 pH 4.5 pH 5.0 pH 5.3

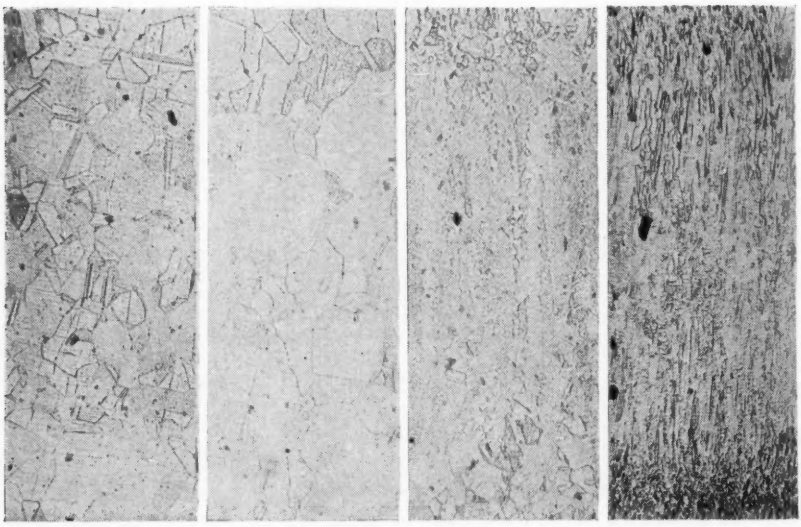
Fig. 8b. Effect of pH on structure of nickel deposited in a Watts type bath at 130° F and 40 asf. 100 X

medium-sized equiaxial grains through *p*H 3.0 (Fig. 9a); at *p*H 4.0 and 4.5 (Fig. 9b) the grains are definitely larger. At *p*H 5.0 there is a retention of the columnar structure as well as some recrystallization to polygonal grains; at *p*H 5.3 the recrystallization is restricted in the direction parallel to the basis metal.



pH 1.75 pH 2.0 pH 2.5 pH 3.0

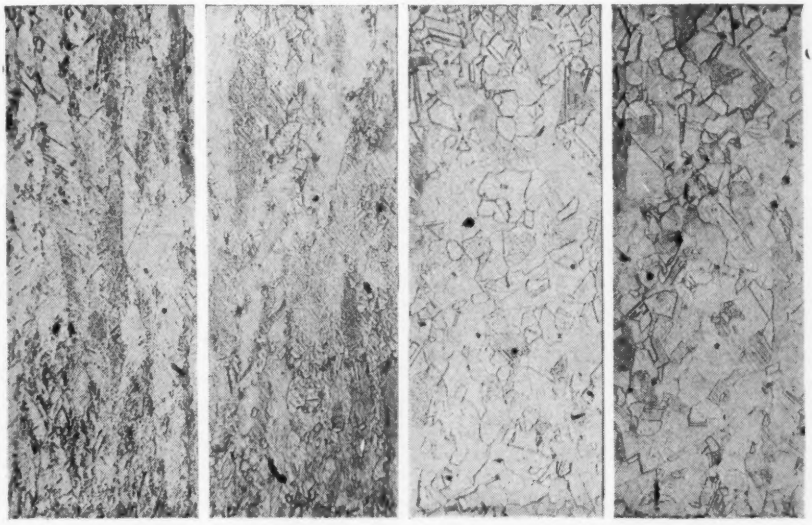
Fig. 9a. Specimens in Fig. 8a after annealing at 1400° F for 15 minutes. 100 X



pH 4.0 pH 4.5 pH 5.0 pH 5.3

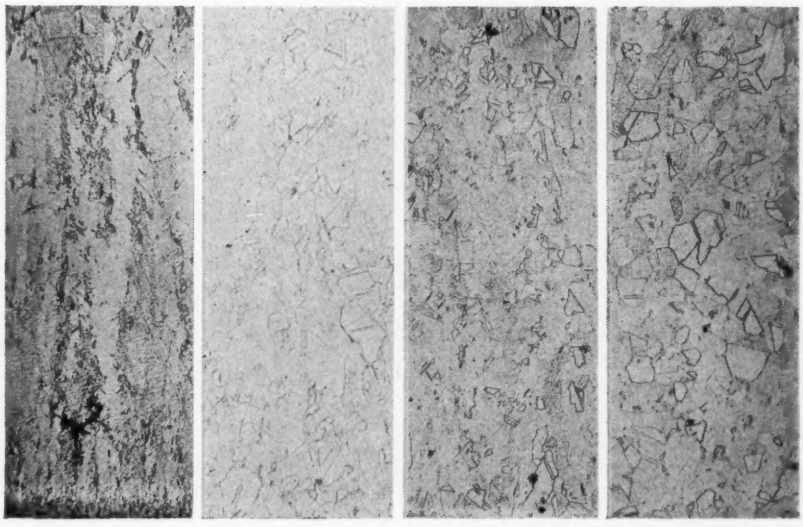
Fig. 9b. Specimens in Fig 8b after annealing at 1400° F for 15 minutes. 100 X

Figs. 10 and 11 show the effect of annealing temperature and time on deposits prepared at *p*H 2.0; recrystallization has started at 1200° F. At *p*H 5.0 (Fig. 12) recrystallization has started at 1200° F, but crystal growth is restricted up to a temperature of 1550° F (see also Fig. 9b, *p*H 5.0 specimen); at this temperature very large



750° F 1200° F 1500° F 1600° F

Fig. 10. Effect of annealing temperature on structure of nickel deposited in a Watts type bath of pH 2.0 at 130° F and 50 asf. Annealing time 15 minutes. 100X

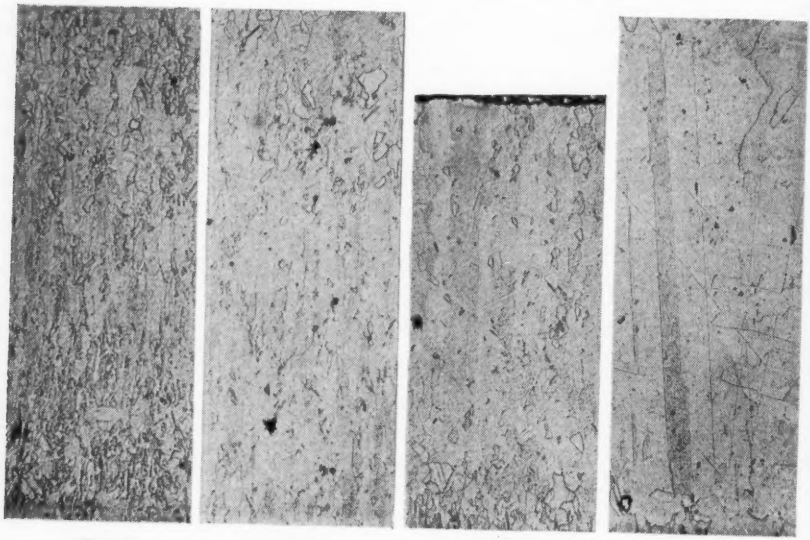


1100° F 1200° F 1300° F 1400° F

Fig. 11. Effect of annealing temperature on structure of nickel deposited in a Watts type bath of pH 2.0 at 130° F and 50 asf. Annealing time 10 hours. 100X

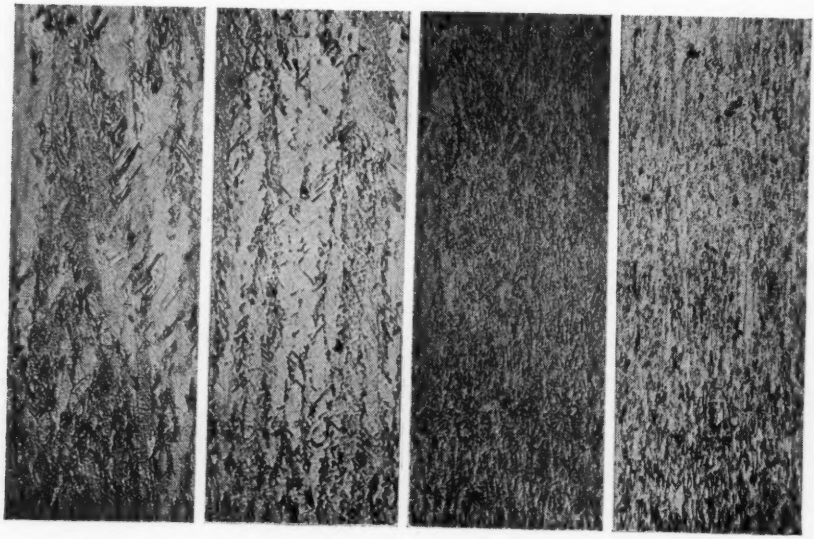
grains, some of which extended almost through the specimen, were formed. Between 1500° and 1550° F the ductility fell off markedly.

Fig. 13 shows the effect of current density on as-plated deposits. At *p*H 2.0 the structure is the normal columnar. At *p*H 5.0 the grain size increases from 10 to 40 asf



1200° F 1300° F 1500° F 1550° F

Fig. 12. Effect of annealing temperature on structure of nickel deposited in a Watts type bath of pH 5.0 at 130° F and 40 asf. Annealing time 15 minutes. 100X



10 asf pH 2.0 | 25 asf pH 2.0 | 10 asf pH 5.0 | 25 asf pH 5.0

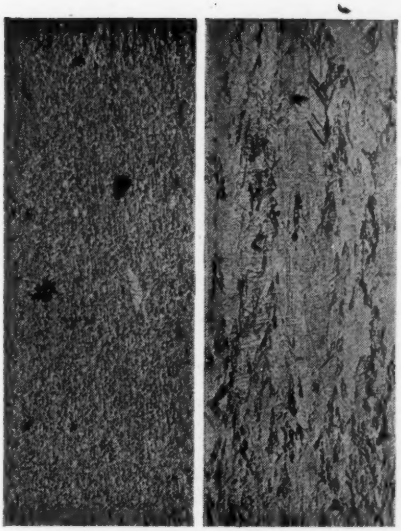
Fig. 13. Effect of current density and pH on structure of nickel deposited in a Watts type bath at 130° F. 100X

(see also Fig. 8b) consistent with the decrease in hardness.

Fig. 14 shows the effect of solution temperature on deposit structure at *p*H 2.0; the finer grain size at the lower temperature corresponds to the highest deposit hardness obtained.

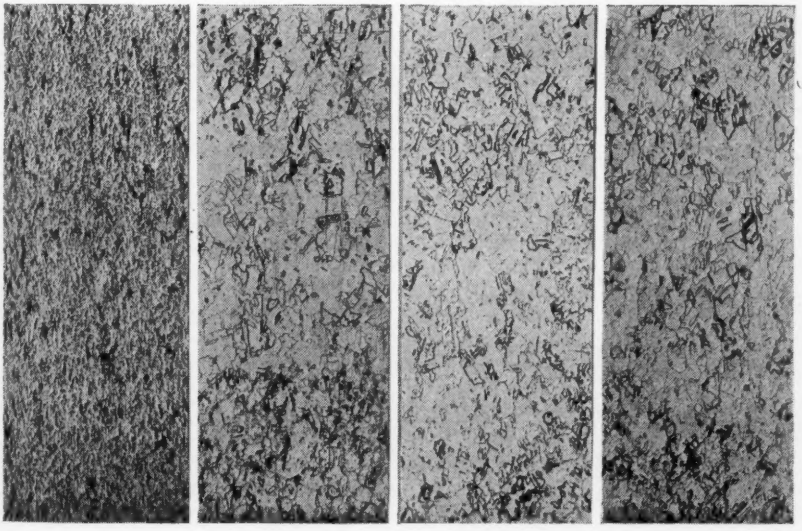
The deposits shown in Fig. 15 are from the all-chloride bath; recrystallization started at a temperature above 1200° F with the grains remaining comparatively small.

Gardam and Macnaughtan[4] noted the presence of small, orderly disposed black spots in a number of polished unetched nickel specimens and attributed them to the presence of non-metallic inclusions which, in etched specimens, were grouped along the grain boundaries. These inclusions were not observed in any of the present unetched specimens but could be seen in a number of the annealed and etched specimens.



85° F 170° F

Fig. 14. Effect of bath temperature on structure of nickel deposited in a Watts type bath of pH 2.0 at 50 asf. 100X



1200° F 1400° F 1500° F 1600° F

Fig. 15. Effect of annealing temperature on structure of nickel deposited in an all-chloride bath of pH 2.0 at 130° F and 55 asf. 100X

Conclusions

The highest as-plated deposit ductility, 37.3 per cent elongation in one inch, was obtained in the Watts solution at *p*H 4.5. Annealing of this deposit for 15 minutes at 1400° F gave a value of 54.6 per cent, the highest obtained under any conditions.

Over-annealing causes a marked loss of ductility of nickel deposits. With a 15-minute anneal, the ductility passes through a maximum of 50 per cent elongation at 1400° F for deposits from both the Watts and all-chloride solutions. With a ten-hour anneal, the maximum ductility for the Watts deposit is the same but occurs at 1200° F.

Annealing for 15 minutes at 1400° F raised the elongation of all deposits to a value of about 50 per cent which was independent of *p*H, current density, temperature and composition (Watts and all-chloride) of the solution.

With the Watts solution at *p*H 2.0, the current density had practically no effect on the mechanical properties of the as-plated deposits. At *p*H 5.0 the ductility remains constant, but the hardness and tensile strength both increase with decrease in current density.

The hardness and tensile strength of as-plated deposits decrease while the ductility increases with increase in solution temperature, the effect being more pronounced at low than at high *p*H.

Acknowledgment

The author wishes to acknowledge the advice and criticism of Dr. W. A. Wesley of The International Nickel Company, Research Laboratory.

Literature Cited

[1] Wesley, W. A. and Roehl, E. J., *Trans. Electrochem. Soc.* **82**, 37 (1942).

[2] Wesley, W. A., *Monthly Rev. Am. Electroplaters' Soc.* **25**, 581 (1938).

[3] Wesley, W. A. and Carey, J. W., *Trans. Electrochem. Soc.* **75**, 209 (1939).

[4] Gardam, G. E. and Macnaughtan, D. J., *Trans. Faraday Soc.* **29**, 755 (1933).

[5] Martin, B., *Proc. Am. Electroplaters' Soc.* **32**, 206 (1944).

A. E. S. Publicity

To meet the increasing need for a well-coordinated program for publicizing the activities and accomplishments of the Society, PRESIDENT HUSTON has appointed the following Publicity Committee:

MR. FRANK K. SAVAGE, Standard Plating Rack Company, *Chairman*

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MR. E. T. CANDEE, American Brass Company, Liaison to Research Committee

MR. A. R. PUTNAM, Liaison to National Office

As indicated by the liaison arrangements, close cooperation will be established with the Research Committee and the National Office.

1948 Convention Committee Organized

The Newark Branch Convention Committee which will handle the 35th Annual Convention of the A. E. S. and the Industrial Finishing Exposition to be held in Atlantic City on June 28 to July 1, 1948 met at Convention Headquarters, 35 Fourth Street, Newark, N. J., on September 9, MR. HORACE SMITH presiding.

The following were chosen to head the various activities:

MR. HORACE H. SMITH
General Chairman

MR. GEORGE WAGNER..... *Finance*

MR. MYRON DIGGIN..... *Education*

MR. GEORGE WAGNER
Industrial Exhibits

MR. LOUIS DONROE.... *Branch Exhibits*

MR. PAUL A. OLDAM
Program and Entertainment

MR. JOHN GUMM..... *Registration*

MR. GEORGE REUTER..... *Banquet*

MR. WILLIAM F. BRUHNS..... *Publicity*

MRS. REGINA MUNNING has kindly consented to head the Ladies' Committee and has chosen as her co-workers, MRS. CATHERINE SMITH, co-chairman, and MRS. JENNY WAGNER, secretary.

(*Continued on page 1177*)

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MR 10

A PROGRAM OF TRAINING FOR APPRENTICE POLISHERS AND PLATERS

ADOLPH BREGMAN

Consulting Engineer, New York City

THIS ARTICLE DESCRIBES A PLAN DEVELOPED FOR THE JOB PLATING SHOPS OF GREATER NEW YORK, LONG ISLAND, AND WESTCHESTER COUNTY, NOW OPERATING UNDER THE NEW YORK STATE APPRENTICESHIP COUNCIL.

A training and lecture schedule has been launched by the Masters' Electro-Plating Association, New York, which is based on the actual operations and flow of work in representative job plating shops in this area. In the opinion of the operators of these shops it is the most desirable and, at the same time, practicable sequence of work experiences required to produce a fully trained job electroplater or polisher.

It has been set up to cover, in a graded series progressing from simple skills and operations to increasingly difficult and complex performances, all of the basic operations in a job plating shop engaged in miscellaneous and representative finishing of metal objects.

The timing and sequence are necessarily tentative; they will vary somewhat from shop to shop and from one time to another in the same shop depending upon the special finishes customarily produced and the successive jobs which happen to come into the shop during the given period.

It can rarely be expected that any one shop can provide experience in every phase of electroplating and polishing. The limitations in experience which will inevitably result from training in any one shop should be compensated for by lectures and laboratory work during the last year of apprenticeship, at which time it is suggested that all phases of metal finishing be surveyed.

The training program covers three years with a total of 6,000 hours of working time and 432 hours of related instruction in the form of lectures.

TRAINING FOR POLISHERS

Definition of a Job Polisher

A job polisher is an employee who can polish, grind, and buff work of unusual design or shape requiring extreme care in the maintenance of contours, radii, close dimensions and uniformity of shape. He is responsible for a high degree of perfection in his work. He maintains wheels and buffs.

Summary of Skills and Information Required

SKILLS REQUIRED pertain to

Heading up a wheel, including preparation of the glue, the abrasive, and the wheel

Balancing of a wheel

Polishing and buffing of all sorts of metals and metal surfaces of diversified size and shape, including grinding, cutting down, polishing, coloring, greaseless finishing, scratch brushing, and wire brushing.

Design of work holders (jigs).

INFORMATION REQUIRED includes

Types of wheel and wheel construction as well as *abrasive materials* and their respective application to various metals, shapes and finishes.

Most effective *sequence of polishing operations* to produce the required finish.

AGE LIMITS are 18 to 30 (except for veterans who are given special consideration).

EDUCATIONAL REQUIREMENTS are High School graduation or satisfactory compensating qualifications.

PROGRESSIVE RATE OF PAY is shown in the following table:

Six-month period	Pay in % of Journeyman's minimum rate
First	60
Second	65
Third	75
Fourth	80
Fifth	90
Last	95

Shop Training and Lecture Program

FIRST SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Three months of general shop orientation as helper in and around plating room to acquant apprentice with general shop procedure, identification of metals and metal finishes, and appearance of objects before and after plating at the stage where they are ready for the buff or polishing wheel; cleaning, degreasing, inspection, wrapping, and drying.

Three months of introduction to the wheel: scratch brushing to get feel of wheel in action on a slow-moving lathe; buffing copper and brass spinnings of simple shape.

LECTURE PROGRAM (72 HOURS)

(identical for polishers and platers)

Thirty-six hours of orientation in the industry: the products being finished, the reasons for the finishes, the base metals—their nature and properties.

Thirty-six hours on the preparation of base metal for the plate: cleaning; elements of grinding, polishing, and buffing; photomicrographs of polished surfaces in various stages; profilometer charts, etc.

SECOND SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Buffing, coloring and greaseless compound finishing of spinnings and stampings of simple shape and small size of brass, copper, steel, aluminum, nickel and chrome-plated surfaces; wheel sizes no greater than 8 to 10 inches; *repetitive work* in order that apprentice gain dexterity and confidence on a fast polishing lathe.

LECTURE PROGRAM (72 HOURS)

Description of polishing wheels, buffs, lathes and exhaust systems; abrasives.

THIRD SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Grinding and cutting down operations on cast and sheet metal objects of small size and relatively simple shape; wheels, sizes up to 12 inches.

LECTURE PROGRAM (72 HOURS)

Recognition of properly ground surfaces; work holders, jigs, etc.

FOURTH SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Grinding and cutting down operations on cast metal objects of increasingly intricate shapes and diversified sizes using largest wheels, up to 18 inches; rough grinding and *use of cross grain emery wheel* on cast iron; setting up of emery wheel, one or two hours per week.

LECTURE PROGRAM (72 HOURS)

Mounting wheels on spindles, spacers, balance, bushings; *wheel truing, facing, dressing; wheel speeds; glue and other adhesives,* their preparation and application.

FIFTH SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Diversified cutting down, coloring, grinding and finishing, *carrying through the complete series of polishing processes* on varied types of work, including experience with rag, felt, leather, etc., wheels and buffs, and various grades of emery and other abrasive and polishing materials; *selection and setting up of wheels* under supervision, with emphasis on adherence to specifications on radii, contours, angles and other essential dimensions.

LECTURE PROGRAM (72 HOURS)

Setting up wheels and preparation of wheel heads; *polishing sequences* for various materials and surfaces.

SIXTH SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Production polishing of work of all kinds as it comes through shop, acquiring speed of operation and efficiency.

LECTURE PROGRAM (72 HOURS)

Belt polishing, sand bobbing and other specialties.

NOTE: Throughout the course of training the following general principles should be observed and followed insofar as feasible:

1. Shape of objects given to apprentice to work on should progress from simple to intricate and from small to large.

2. Metals worked on should progress from soft to hard, from spinnings to stampings to forgings and castings.

3. Wheels should progress from small to large, soft to hard, slow to fast.

However, at all stages, the trainee should not be kept exclusively at any one operation for too long in order that previously acquired skills and adjustments may not be lost. This should be particularly observed with respect to wheel speed; rough grinding at low wheel speeds should be alternated with the more rapid buffing in order to avoid loss of adjustment to either.

TRAINING FOR ELECTROPLATERS

Definition of a Job Electroplater

A job electroplater is an employee who applies a wide variety of electroplated finishes to job lot parts of different metals which require close thickness limits, estimates current density and plating time, determines cleaning and plating methods, maintains solutions, directs work of tank operators and helpers, and understands operation of plating equipment.

Inventory of Work Processes, Information, and Skills Required

APPLICATION OF THE FOLLOWING FINISHES:

Plated brass, copper, cadmium, chromium (hard, decorative, and black), nickel (white, bright, hard, and black), tin, zinc, lead, gold, silver, rhodium, miscellaneous alloys and proprietary coatings

Anodized and dyed finishes

Rustproof and black finishes by phosphating (Parkerizing, Bonderizing, etc.), including black oxide and molyblack

Chemical finishes by coloring, acid dipping, oxidizing, chromating, etc.

TO BASE METALS of aluminum, brass, copper, lead, nickel silver, silver, steel, stainless steel, tin, zinc and zinc-base die castings, and non-metallics

IN THE FORM OF spinnings, stampings, castings, forgings, and molded pieces, by means of

OPERATIONS FOR PREPARATION OF THE BASE:

Racking, wiring, and stopping-off

Cleaning in potash or soak cleaner, electrocleaning, scouring, and cyanide dipping

Tumbling (dry and wet), sand blasting, stripping of old finishes (varies with plate), degreasing, pickling (acid dip or etch), bright acid dipping, activation and sensitizing of non-metallics

PLATING OPERATIONS:

Make-up and maintenance of plating solutions to produce the required finish on a given base (composition, *p*H); choice and control of time of immersion, current density, voltage, and temperature, and

OPERATIONS AFTER TREATMENT:

Bright acid dipping, chromate dipping, chromic acid dipping, water dip lacquering, baking (to prevent hydrogen embrittlement), drying (in sawdust, air, oven), stop-off removal, unwiring, unracking, inspection, and packing, requiring the use of the following:

EQUIPMENT AND INSTRUMENTS:

Tanks (hand and semi-automatic) and barrels

Electrical equipment: low voltage generators, rectifiers, rheostats, ammeters, voltmeters, ampere-hour meters, and motors, as well as electric wiring of tanks

General shop equipment such as blowers, exhaust systems, and baking ovens

Instruments, including magnetic thickness gauges, time clocks, hydrometers, and *p*H meters.

ANALYSIS: Knowledge of basic chemistry sufficient to be able to analyze solutions.

AGE LIMITS are 18 to 30 (except for veterans who are given special consideration).

EDUCATIONAL REQUIREMENTS are High School graduation or satisfactory compensating qualifications.

PROGRESSIVE RATE OF PAY is shown in the following table:

Six-month period	Pay in % of Journeyman's minimum rate
First	60
Second	65
Third	75
Fourth	80
Fifth	90
Last	95

Shop Training and Lecture Program

FIRST SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Three months of general shop orientation: wrapping, inspection, unwiring, unracking, sawdust drying, placing in trays, and general factory work. During this period apprentice should become acquainted with shop procedures, names and types of finishes and colors, and the general vocabulary of the shop.

Three months of wiring, racking, and stopping-off on production work.

LECTURE PROGRAM (72 HOURS)

(identical for platers and polishers)

Thirty-six hours of orientation in the industry: the products being finished, the reasons for the finishes, the base metals—their nature and properties.

Thirty-six hours on preparation of the base metal for the plate: cleaning; elements of grinding, polishing and buffing; photomicrographs of polished surfaces in various stages, profilometer charts.

SECOND SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Three months on simple dipping and rinsing operations, degreasing, and drying.

Three months on cleaning operations that immediately precede plating at which stage work must be chemically clean; *unloading* plating tanks and barrels, rinsing; generally *assisting tank operator; sand blasting.*

LECTURE PROGRAM (72 HOURS)

Elementary high school chemistry.

THIRD SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Three months loading plating tanks and barrels (no rheostat or current operation); operating a tumbling barrel.

Three months operating a single tank under supervision, including rheostat; checking appearance of plated finish.

LECTURE PROGRAM (72 HOURS)

Elementary high school chemistry (concluded).

FOURTH SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Operating under supervision several tanks and barrels, including rheostats (copper, nickel, cadmium, zinc and tin plate); *making additions of chemicals* to solutions as directed.

LECTURE PROGRAM (72 HOURS)

Elements of electricity.

FIFTH SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Three months on application of oxidized finishes, rustproofing, anodizing and *miscellaneous* chemical *finishes; determining cleaning methods.*

Three months on plating to specification all required finishes, including black nickel, decorative chrome, gold, silver, etc.; determination of current densities; wiring, racking and stopping-off methods.

LECTURE PROGRAM (72 HOURS)

Plating chemistry, solution analysis.

SIXTH SIX MONTHS

SHOP TRAINING (1,000 HOURS)

Electroplating without supervision; directing helpers; running analyses and correcting faulty solutions; making up of solutions; determining causes of rejects; general trouble shooting.

LECTURE PROGRAM (72 HOURS)

Review of all plated finishes; shop equipment, electrical and other *equipment, safety* installations, etc.

Job Shop Operations

The Masters' Electro-Plating Association, 123 William Street, New York 7, N. Y., in its *Monthly Bulletin* for July advises that the rate of operation among its members was 50 per cent during July, 1947 against 52½ per cent during June, 1947 and 77½ per cent during July, 1946.

The drop, which started in October, 1946, is believed to be associated with the drop in sales of consumers' durable goods which is considerably below its normal ratio to total consumer spending. Platers in the "West", it is stated, have felt very little decline because they cater to the automobile industry which is going full blast.

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DROP TEST* FOR DETERMINING THICKNESS OF ZINC COATINGS

DR. RICHARD SPRINGER
Berlin, Germany

The following method has been widely employed in Germany during the last several years. Its simplicity is hardly surpassable, and its accuracy sufficient for many practical purposes.

It has a disadvantage, that the cited factor for conversion of number of drops to thickness holds only for deposits from alkaline solutions containing sulfides. For deposits from other solutions, especially from acid solutions, a different correlation factor must be determined and employed.

Principle

A drop of corroding solution containing chromic acid and sulfuric acid is placed by means of a glass rod on the zinc deposit to be tested. After 15 seconds the drop is removed by means of a dry piece of absorbent cloth. Another drop is then applied in the same spot for the same length of time, and the operation repeated until the base metal stands out against the surrounding coating. The number of drops applied is a measure of the thickness of the coating.

Reagents and Apparatus

The following are required to carry out the test:

½ l solution of 120 g/l chromic acid (CrO_3) and 35 g/l sulfuric acid (H_2SO_4) in a flask with glass stopper

The smallest available glass beaker, about 50 cc capacity

A $\frac{3}{16}$-inch diameter glass rod with rounded end

¼ l of an organic solvent such as trichlorethylene, carbon tetrachloride, benzine, acetone

A few pieces of absorbent cloth

Filter paper or blotter.

Procedure

1. The area to be tested is degreased by means of rubbing with an absorbent cloth and a few drops of the organic solvent.

2. A few cc test solution is placed in the beaker. Its temperature during the test should be about 20° C (68° F).†

3. A drop of the test solution is taken from the beaker on a dry glass rod and placed on the point to be tested, at which monent a stop watch is started or the position of the second hand on an ordinary watch observed.

4. After 15 seconds the drop is removed rapidly by means of an absorbent piece of cloth.

5. A second drop of test solution is applied at the same point and removed after 15 seconds in the same manner.

6. The application and removal of drops are repeated until the base metal appears.

7. Each drop applied for 15 seconds removes 0.008 mm (0.000039 inch) zinc.

Notes

The size of the drops has no effect on the result.

The removal of the drop must take place rapidly and without stopping, otherwise the next drop spreads over a wider area.

The application time of 15 seconds may vary ± 2 seconds without affecting the result.

---

*EDITOR'S NOTE: A drop test which includes placing individual drops of a corroding solution on the surface to be tested should not be confused with a "dropping test" in which a substantial number of drops are allowed to hit the surface in relatively rapid succession.

†EDITOR'S NOTE: Undoubtedly, the part to be tested should be of the same temperature as the test solution.

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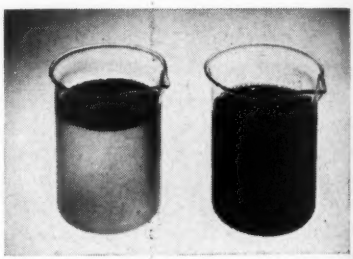

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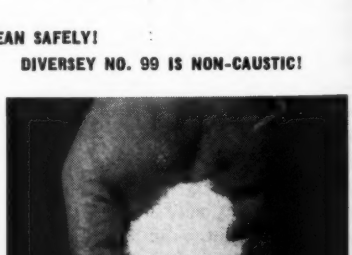

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MEASUREMENT OF THICKNESS OF COPPER AND NICKEL PLATE

a Comparison of Methods

G. B. BOWMAN

Standard Steel Spring Company — Coraopolis, Pa.

A number of methods are in common use for the measurement of thickness of plated coatings of copper and nickel including the microscopic method which is considered standard, chemical methods, and magnetic methods.

The chemical methods differ from the microscopic method in that they provide an average thickness over a chosen area instead of a more or less pin-point thickness value. Also, tests by the chemical methods are performed more rapidly, no time-consuming polishing of the specimens being required. It should be noted that application of a chemical method is limited to plane surfaces with a reasonable uniform coating thickness. Its main value is, therefore, in the determination of thickness of plate on a large number of test panels. Care must be taken that the chosen area is large enough that the weight of the metal is within the accuracy of the chemical analysis, and yet not so large that the significance of the measurement is lost.

Magnetic thickness methods differ from the microscopic and chemical methods in that they are non-destructive. While their accuracy is less than that of the microscopic method, the applicability to measurements on the finished product and the speed of measurement frequently compensate for any sacrifice in accuracy.

Procedures

All tests were made on 4 x 6 x 1/16 inch thick panels of SAE 1085 steel having a profilometer reading of 8 micro inches. After plating with copper or nickel, the specimens were demagnitized to less than 15 degree deflection at 3.0 cm by the method described in THE MONTHLY REVIEW **33**, 1044–1045, 1092 (1946). This amount of residual magnetism has very small influence on measurements made by the magnetic instruments.

Magnetic readings were taken first by means of the two instruments used—the Magne-Gage manufactured by American Instrument Company and the General Electric Tester—at all points, 1–9, shown in Fig. 1. The specimens were then cut both

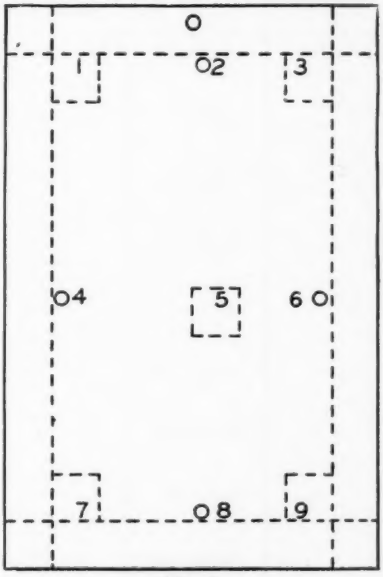


Fig. 1

for chemical and microscopic measurements, after which chemical determinations were made at positions 1, 3, 5, 7 and 9 and microscopic determinations at 2, 4, 6 and 8.

Chemical Method for Nickel: The plate on the back of each sample was removed by grinding. The ½ inch square samples were accurately measured. The nickel was removed by solution in 25 ml fuming nitric acid to which concentrated nitric acid was added dropwise to increase the rate of solution. After removal of the sample, the solution was diluted with water, and 5 ml of hydrochloric acid and 10 ml of a 25 per cent by weight of solution of tartaric acid were added. The solution—when the sample had very thick nickel coatings aliquots were taken—was then made basic to litmus with ammonium hydroxide, an excess being avoided, and heated to 150° F before 30 ml of a 1 per cent alcoholic solution of dimethylglyoxime was added. The precipitate was taken by filtering through a weighed gooch crucible, washed well with hot water and dried for 1 hour at 110° C. The nickel thickness in inches, T_{Ni}, was calculated from the formula T_{Ni} = 0.00139 x wt. gain/area in sq. in.

Chemical Method for Copper: After preparation of the sample in the same manner as for the nickel determination, the copper was removed by solution in 25 ml of concentrated nitric acid. After the sample had been taken out of the solution, 10 ml of concentrated sulfuric acid was added, the solution heated to fuming, cooled, and diluted to 150 ml with water. Then 5 ml concentrated hydrochloric acid was added, and hydrogen sulfide introduced to precipitate copper sulfide which was taken on Whatman No. 40 filter paper, washed well with cold water, ignited and weighed. The precipitate was then dissolved in 20 ml nitric acid (sp. gr. 1.20), the solution made basic with ammonium hydroxide added in 5 ml excess, and the precipitate filtered off, washed, ignited and weighed. The difference in weight is the true weight of copper oxide. The copper thickness in inches, T_{Cu}, was then calculated from the formula T_{Cu} = 0.0054 x wt. gain/area in sq. in.

Microscopic Method: The cut samples

TABLE I
Nickel Thickness by Three Methods

Specimen No.	Method	Average Value, mils	Deviation aver.	Deviation extreme	Average Value, %
1	Microscopic	0.95	±0.03	+0.03 −0.05	100 ± 3
	Chemical	1.01	±0.07	+0.09 −0.11	106 ± 7
	Magne-Gage	0.99	±0.04	+0.04 −0.10	103 ± 4
2	Microscopic	1.47	±0.09	+0.07 −0.09	100 ± 6
	Chemical	1.48	±0.08	+0.12 −0.23	100 ± 5
	Magne-Gage	1.36	±0.07	+0.09 −0.10	93
3	Microscopic	2.04	±0.05	+0.10 −0.07	100 ±
	Chemical	2.21	±0.07	+0.08 −0.12	108 ± 4
	Magne-Gage	2.10	±0.08	+0.15 −0.10	103 ± 4

were mounted in Lucite. The surface was ground flat and polished on No. 1, No. 0, No. 00, and No. 000 papers followed by a wax wheel with levigated alumina and a silk wheel with green rouge. The specimens were then etched in 2 per cent nital (2 ml concentrated nitric acid in 100 ml ethyl alcohol) and the thickness read at 1000× magnification.

Result

The results are given in Tables I and II.

Discussion

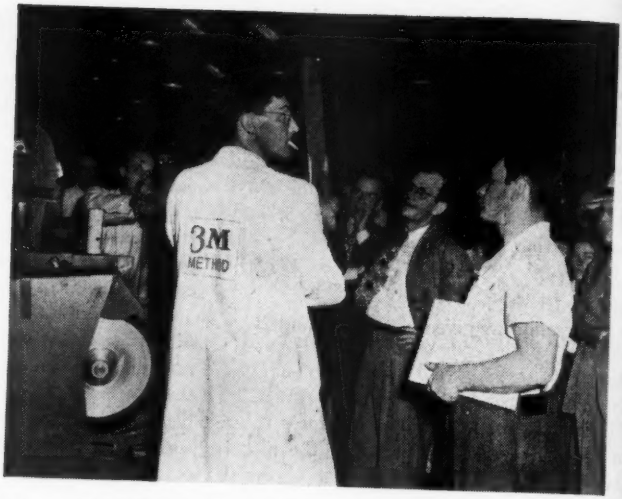
Assuming the microscopic thickness value to be correct and 100 per cent, the nickel thickness values obtained by the chemical and Magne-Gage methods fall within roughly ±10 per cent.

The values for the copper thickness vary considerably more. The greatest percentage variation occurs at the low thickness value. The explanation is obvious: the average deviation from the average is of the same order of magnitude independent of the thickness and substantially independent of the method. Since in the case of the low copper thickness, the microscopic method gives results that are much lower than those of the other methods, one may legitimately raise a question about its accuracy. For thicknesses of 1 to 2 mils, there is relatively little to choose between the several methods when the copper coating is applied on high carbon steel of the smoothness given above.

TABLE II
Copper Thickness by Four Methods

Specimen No.	Method	Average Value, mils	Deviation aver.	Deviation extreme	Average Value, %
1	Microscopic	0.49	±0.12	+0.17 −0.24	100 ± 24
	Chemical	0.57	±0.11	+0.18 −0.18	116 ± 22
	Magne-Gage	0.60	±0.10	+0.10 −0.35	122 ± 20
	G. E. Tester	0.66	±0.09	+0.17 −0.11	135 ± 18
2	Microscopic	1.03	±0.08	+0.12 −0.17	100 ± 8
	Chemical	1.07	±0.06	+0.15 −0.25	104 ± 6
	Magne-Gage	0.92	±0.11	+0.06 −0.17	89 ± 11
	G. E. Tester	1.06	±0.08	+0.11 −0.18	103 ± 10
3	Microscopic	2.26	±0.04	+0.04 −0.05	100 ± 2
	Chemical	2.25	±0.07	+0.10 −0.07	100 ± 3
	Magne-Gage	Beyond limit of available instrument			
	G. E. Tester	2.19	±0.09	+0.31 −0.14	97 ± 4

DETROIT, 1947



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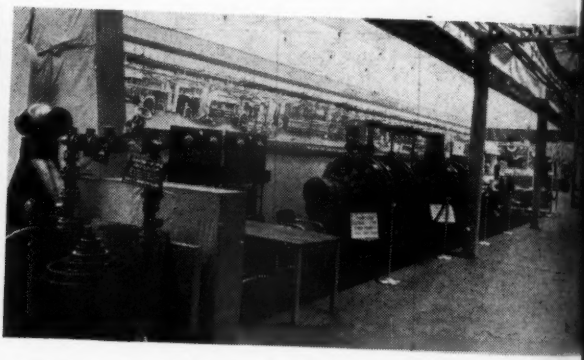

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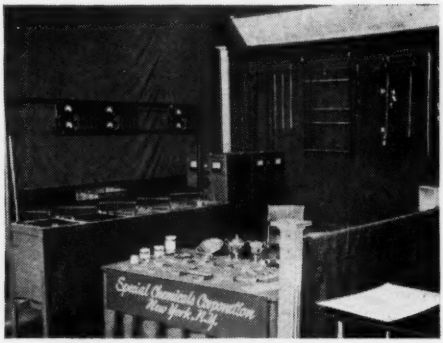
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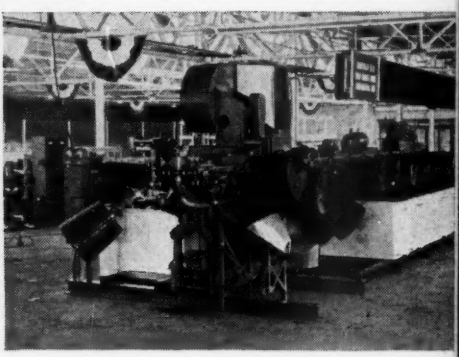

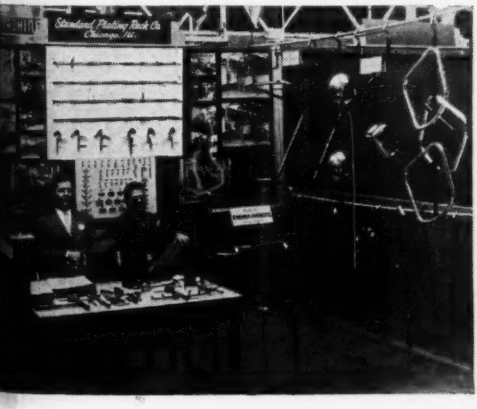
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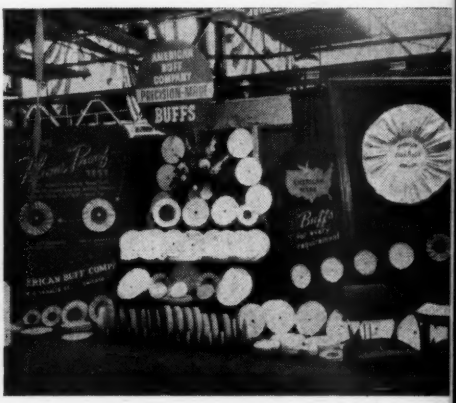
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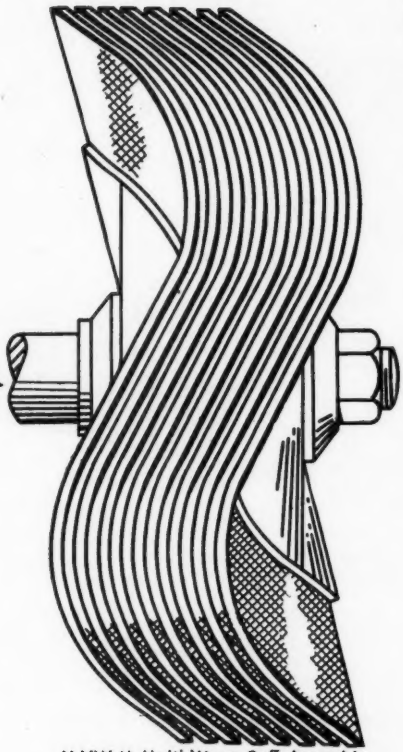

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BOOK REVIEWS

By DR. HAROLD J. READ

Associate Professor of Metallurgy—The Pennsylvania State College

CHEMISTRY FOR THE EXECUTIVE by Ralph K. Strong, 1946, VIII + 445 pages. Reinhold Publishing Corp., 330 W. 42nd Street, New York, N. Y.

As is the case with most books devoted to chemistry for the business man, emphasis is placed here upon the non-mathematical aspects of the science. This requires, of course, that the subject matter be limited largely to descriptive organic and inorganic chemistry. The fields of physical and analytical chemistry are only sketchily treated. This is as it should be since the audience to which this book is directed will have little need for material other than that which is given. It is encouraging, however, to note that the author does treat his audience as intelligent human beings and does not scruple to use elementary mathematics where it will enhance the presentation of his subject matter.

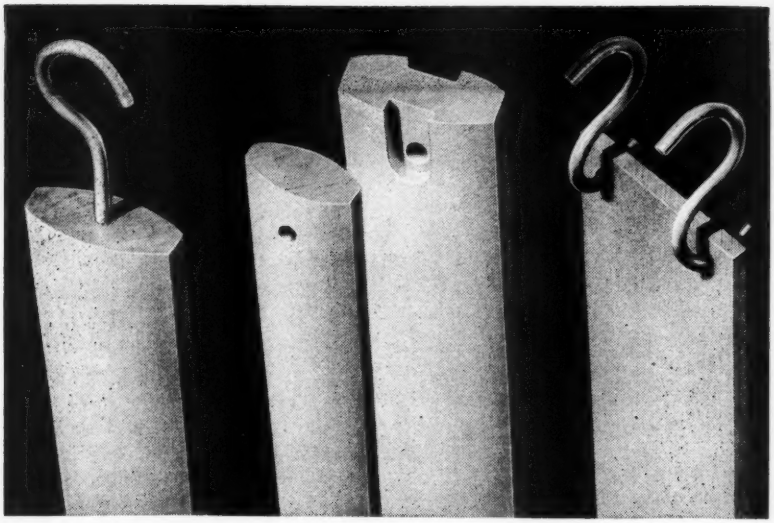
The portion of the book devoted to inorganic chemistry is, on the whole, somewhat more satisfactory than that dealing with organic chemistry. This is not particularly surprising since the presentation of the latter field in the comparatively short space available in a text of this sort is fraught with very considerable difficulties. It is felt, however, that the author has been somewhat too ambitious in the scope of his undertaking and that a limitation of his subject matter in the field of organic chemistry would have resulted in material which would have been easier for the reader to understand and would probably be of more value to him.

One of the rather unusual features is the inclusion at the end of each chapter of supplementary notes and tables of data which, taken as a whole, constitute a sort of minor handbook which the reader may find to be very useful.

The author has chosen to present his material *via* the ancient literary device of dialogue. There is little doubt that at least in some cases this method of presentation has possibilities. Whether or not this is the case in the present instance will to a large extent, one imagines, depend upon the reader. The present reviewer found it exceedingly boring and, in some respects, downright annoying. Possibly some of this annoyance arises from the fact that the protagonists of the dialogue, a supercilious and condescending interrogator, named Mr. Executive, and a spineless fountain of knowledge with the horrible designation, Chemmer, are absolutely unbelievable characters. As the author points out in the preface, the use of dialogue did not enter into the original plan of the book, and it may be that this accounts in part for the unsatisfactory character of the writing as far as conversation is concerned.

The latter remarks may indicate that the book is unsatisfactory, but we hasten to correct such an impression. It is only the method of presentation to which objection is raised. The technical content of the book appears to be above reproach and gives every evidence of painstaking writing and careful editing.

As is particularly desirable in a book of this sort, the name and subject indexes are very complete so that the busy user should have little trouble in finding the information which he desires.



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Chairman, Program and Educational Committee

An X-Ray Method for Measuring the Thickness of Thin Crystalline Films

A. EISENSTEIN. *J. Appl. Phys.* **17**, 874–886 (1946).

When X-rays are scattered from a thin crystalline surface film overlying a crystalline base material, diffraction lines are observed from both materials. Equations are developed for the general case of a flat sample and a cylindrical sample, expressing ratio of line intensities from the two materials as a function of film thickness. A usuable range of 10^{-6} to $5x10^{-2}$ cm is indicated.

A New Electrochemical Jet Method of the Determination of Thickness of the Electrolytically Deposited Metal Layer (Cr, Ni, Sn, Cu and Cd)

A. OGARER. *Applied Chem.* (U.S.S.R.) **19**, no. 3, 311–315 (1946).

Newly developed method of electrochemical determination of thickness of electrolytically deposited metal layers is described.

Some New Aspects of the Protection of Steel by Tin and Tin Alloy Coatings

E. S. HEDGES and W. E. HOARE. *Metal Treatment* **13**, 197–205 (Autumn 1946).

Two electrodeposited tin-zinc alloy coatings containing 80 per cent and 50 per cent of tin respectively are available for protection of steel. The 80:20 coating is suitable for moist or salt-spray conditions and has excellent solderability. The 50:50 coating is more suitable for conditions of prolonged immersion in water or for applications where the coating is likely to become seriously damaged.

Metallizing Glass and Ceramic Materials

A. J. MONACK. *Glass Industry* **28**, 21–25, 40, 42–44 (Jan. 1946).

Reviews purposes and fundamentals of metallizing; mechanical films; metallic paints; metal spraying; cathode sputtering and metal evaporating; chemical reduction films; electroplating; and theoretical aspects.

Bright Nickel Plating

A. F. BROCKINGTON. *Metal Ind.* (London) **69**, 468–470, 513–514 (1946).

Discusses advantages and disadvantages of Watts type solutions, brightening agents, alloy deposits of cobalt-nickel, effects of various contaminants upon the solutions, and methods for their removal.

The Control of pH in Nickel Plating Solutions

H. BANDES. *Electrochemical Soc.* Preprint **90**, –34, 1946, 14 pp.

Equations are given for computing the amount of acid or base necessary to lower or raise the *p*H of a nickel plating solution a given amount. Equations were derived from the experimental potentiometric titration data. Procedure for carrying out the titrations is discussed, as is the significance of the results to the nickel plating process.

Factors Affecting the Distribution of Electrodeposits

N. A. TOPE. *J. Electrodepos. Tech. Soc.* **22**, 29–44 (1947).

This complex problem is broken down into its many parts, each of which is discussed at length. Important are the pri-

mary current distribution, surface condition, gas evolution, specific conductivity of the materials, anode distribution and materials, electrochemical factors—metal ion concentration, deposition potentials—the effect of strikes, addition agents, and contaminants, etc. Diagrams and tables are included.

LYMAN B. SPERRY.

Effect of Water Conditioning on Metal Finishing Operations

R. S. HERWIG. *Iron Age* **159**, 48–52 (March 27, 1947).

Use of softened water offers many opportunities to metal finishers for improving the quality of plated parts and for extending the life of pickling baths. This article describes an investigation to determine the effect on plating and cleaning cycles of (1) hard water, (2) softened water, and (3) demineralized water. Among the advantages of conditioned water are reduction of drag-in of impurities, improved adhesion, elimination of sludge in hot alkaline baths, better finishes on burnished parts, easier rinsing of burnished parts, and more easily buffed deposits.

Electroplating on Aluminum

E. G. WEST. *J. Electrodepositors' Tech. Soc.* **21**, 211–226 (1946).

Cleaning, surface preparation, and plating on aluminum and aluminum alloys are described. Mechanical roughening, chemical etch roughening, application of immersion deposits (including those of iron, manganese, nickel, copper, and zinc), and anodizing are used to produce adhesion.

Effect of Electrolytic Deposits of Chromium and Nickel on the Oxidation of Iron at High Temperatures

V. I. ARKHAREV, G. I. KOTUKHOVA and E. I. REDKINA. *Zhur. Tekhn. Fiziki* **10**, No. 14, 1210–1216 (1940) (In Russian); *J. Inst. Metals*, Metall. Abst. **13**, 170–171 (May 1946); *Corrosion* **3**, 8, 9 (April 1947).

Thin deposits of chromium and nickel on iron increase its oxidizability at high temperatures. The protective action begins at a certain minimum thickness of the deposit which depends on the temperature and length of time of exposure. Increased oxidation is connected with the predominance of ferrous oxide while decreased oxidation is characterized by the predominance of ferrous-ferric oxide and in part ferric oxide in the scale.

The Metallizing of Glass and Plastics by the Reduction of Aqueous Solutions

PATRICK B. UPTON. *J. Electrodepos. Tech. Soc.* **22**, 45–72 (1947).

This paper is a comprehensive review of extensive but very scattered information. The bibliography contains 126 references. Modern variations in old techniques and new methods are described. The paper is divided into the following parts: (1) surface preparation, (2) general considerations relating to silvering processes and their applications, (3) remarks on particular silvering processes, (4) the use of metals other than silver, and (5) the use of the metal film as a base for electrodeposition. Nine tables present in tabular form, with references, some of the processes mentioned.

LYMAN B. SPERRY.

The Electrolytic Polishing of 18-8 Stainless Steel and Nickel Silver

H. EVANS and E. H. LLOYD. *J. Electrodepos. Tech. Soc.* **22**, 73–84 (1947).

Experiments were carried out on the electropolishing of 18-8 stainless steel and nickel silver in several different solutions. Stainless steel cutlery was best polished in the following:

Orthophosphoric Acid	37% by vol.
Glycerine	56% by vol.
Water	7% by vol.

The strength of the orthophosphoric acid is not stated. For 18-8 stainless steel, 212 to 248° F and 720 asf are recommended; time required, starting with a "barreled" finish, is 5 to 10 minutes. A fine ripple is found on the surface of nickel-silver alloys. This is not marked on the 22 per cent nickel alloy, and a satisfactory finish may be obtained at 122 to 158° F and 144 asf. On lower nickel alloys (12% and 15%), the ripple is too pronounced for the finish to be satisfactory. Further work is considered desirable.

LYMAN B. SPERRY.

Jet Method of Electrochemical Determination of Local Thicknesses of Electroplates

A. OGAREV. *J. Applied Chem.* (U. S. S. R.) **19**, 311–315 (1946).

The thickness of electrodeposits of chromium, nickel, tin, copper and cadmium is determined essentially as follows: a current of constant intensity is passed across an electrolyte flowing through a capillary tube and falling upon the plate; the electrolyte gradually destroys the deposit and the "end point" of the test is given by the sudden change in intensity of current when the base metal is exposed. The time necessary to expose the base metal is used to calculate the thickness of the layer. The calculations are based upon empiric formulas derived from the corrosion rates of the plates in the electrolyte used in the test. The change in intensity of the current corresponding to the end point is abrupt for certain pairs of metals and gradual for others. The optimum current density to be used in the test is determined experimentally for each pair of metals. The same electrolyte is used for all of the plated metals: 5% H_2SO_4, 1.5% NH_4Cl, and 40 cc/l glycerol. This solution has a high conductivity, gives an active anode reaction with respect to the protective layers, and a passive anode reaction with respect to the base metal.

How To Select Coatings for Aluminum

RAY SWAN and N. P. RUTHER. *Steel* **120**, 78–79, 97, 100 (March 24, 1947).

The size, shape and ultimate application of aluminum products must be considered when selecting a coating. Problems confronting the finisher are discussed, recommendations made, and advantages and disadvantages of certain coatings compared.

Plating and Anodizing Aluminum

FRANK TAYLOR. *Light Metals* **10**, 17, 19 (1947).

Plating solutions are described for nickel and tin plating on aluminum. A chromic-sulfuric acid pickle and, in the case of castings, the nitric-hydrofluoric acid pickle are listed as essential for good results. With reference to the zincate dip it is considered essential that the surface be free of grease before immersion in the dip. The use of a copper strike with free cyanide below 0.5 oz/gal before silver or nickel plating is favored in preference to a silver strike or direct nickel plating. The tendency for blistering from the zincate dip coating has been overcome by introducing a flash nickel plate followed by cadmium plating or by replacing the cadmium with a cadmium-zinc alloy deposit. The restricted use of anodizing is due to the high cost of anodizing and the unsuitability of many of the aluminum alloys used.

Chromium Plating on Aluminum

C. J. HINTON. *Modern Metals* **3**, 14–15 (1947).

A discussion of surface condition, the zinc immersion process, cleaning, and plating.

Selection and Application of Mechanical Finishes for Aluminum

RALPH E. PETTIT. *Steel* **120**, 98–99, 115–118 (March 17, 1947).

A description of the mechanical finishes which can be used in surface preparation for coatings or simply for decoration. Each type of finish is considered with some directions for its application, and suggestions are made as to where it can be used to good advantage.

Electroplating Shop Costing

A. W. WALLBANK. *J. Electrodepos. Tech. Soc.* **22**, 97–119 (1947).

Commonly used cost systems for electroplating are considered unsatisfactory. In this paper, costs are elaborately broken down and the various items systematically apportioned to their proper group classification. An outline of costing is given for platers, and an outline of plating for cost accountants. Emphasis is placed upon the desirability of closer co-operation between the two and on the need for each to learn more about the other's system and viewpoint. Applications to still, automatic, and barrel plating and to anodizing are described. Costing of allied operations, such as polishing, is also briefly considered.

LYMAN B. SPERRY.

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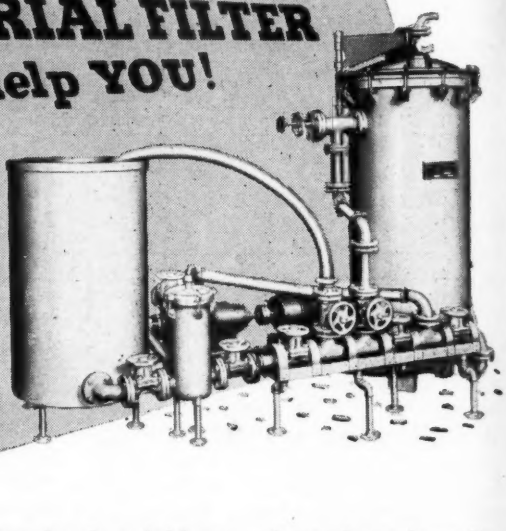

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By GEORGE B. HOGABOOM

Consultant, New Britain, Conn.

No. 2, 422,903, June 24, 1947—Process for Electrolytically Treating Stainless Steel Articles—K. M. Huston, assignor to Western Electric Company.

CLAIM. The process for treating stainless steel articles, which comprises electrolyzing such an article as an anode at an anode current density of from about 350 to about 540 amperes per square foot in an electrolyte consisting of a water solution of fluosilicic acid of from 10 to about 60 per cent concentration for a period of from about twenty seconds to about two minutes while maintaining the electrolyte at a temperature not exceeding about 85° F, washing the thus-treated article with water, and making the wet article the cathode in a cyanide brass plating bath of such composition as to deposit thereon a brass plate containing from about 70 to about 80 per cent of copper.

No. 2,424,718, July 29, 1947—Electrolytic Treatment of Tin Plate for Preventing Sulfur Staining—A. E. Stevenson and B. H. Schaub, assignors to Continental Can Company.

It has been found that, by electrolytic treatment of tin plate as cathode in an alkaline bath containing chromate, a clear bright appearance can be procured and an immunity to sulfur-staining can be conferred thereon which permits non-staining employment of unenameled tin plate in contact with foodstuffs which otherwise would undergo discoloration or staining.

It has further been found that a more efficient treatment can be quickly accomplished by producing a current reversal during the electrolysis, wherein the tin plate is first made the anode during the treatment and then is made the cathode.

CLAIM 4. The electrolytic method of treating tin plate to prevent sulfide discoloration when contacted with sulfur-containing products, which concludes with treating the same for substantially 1 to 15 seconds at a current density substantially 10 to 100 amperes per 100 square inches of effective tin plate area, while maintaining a temperature between substantially 50 and 212° F in an alkaline electrolyte containing soluble chromate in concentration of 2½ to 25 grams per liter computed as anhydrous sodium chromate and having a *p*H of substantially 8½ to 12, a first part of the electrolytic treatment being effected with the tin plate as anode and the final part thereof being for a longer time and with the tin plate as cathode and therewith producing upon the tin plate a surface of clear bright appearance resistant against staining by the sulfur-containing product.

7 Claims.

No. 2,424,674, July 29, 1947—Electrolytic Bright Polishing—H. L. White, assignor to American Rolling Mill Company.

It is an object of the present invention to provide an electrolytic polishing method involving a maximum brightening of the surfaces of a large variety of metals including all types of stainless steels, and in particular that type of stainless steel containing approximately 17 per cent of chromium.

It is a further object to accomplish this brightening with a lower weight loss, and to provide a bath which has superior throwing power. For example, I have polished intricate shapes of 17-chrome stainless steel to a uniform finish comparable to that obtained by buffing with a weight loss of only approximately 0.068 ounce per square foot which corresponds to about 0.0001 inch removed from the thickness of the piece.

CLAIM 2. A process of anodically polishing metals and alloys which under the influence of the electric current are not completely insoluble in phosphoric acid, which are low in metalloids, and which do not form bath-insoluble reaction products with phosphoric acid, said process comprising preparing an electrolyte consisting of from substantially 57.4 per cent to substantially 82.9 per cent by weight of the substance phosphoric acid, from substantially 10.1 per cent to substantially 21.4 per cent by weight of water, and from substantially 2.5 per cent to substantially 32.5 per cent by weight of an organic substance selected from the group consisting of normal butyl alcohol, secondary butyl alcohol, butyl acetate, normal amyl alcohol, secondary amyl alcohol, and amyl acetate and electrolyzing therein such metals or alloys.

CLAIM 5. The process of previous claims wherein the current density is substantially 1 to substantially 5 amperes per treated square inch of said article and wherein the electrolyte is maintained at a temperature of substantially 120° F to substantially 180° F.

5 Claims.

No. 2,424,887, July 29, 1947—Method and Electrolyte for the Electrodeposition of Metals—J. A. Henricks, assignor to Houdaille-Hershey Corporation.

I have now discovered a new class of addition agents that produce bright and ductile copper deposits from the acid bath and that have none of the defects of prior art addition agents referred to herein above. These novel addition agents are sulfurized aromatic and hydroaromatic hydrocarbons, and substitution products or derivatives thereof that have been rendered more or less water soluble or water dispersible by sulfonation. The substitution products of the hydrocarbons include specifically alkyl benzenes, phenols and aromatic amines.

I have found the broad operating conditions for depositing lustrous and ductile copper by the use of brightening agents described above to include the following:

$CuSO_4 \cdot 5H_2O$. . . . . 0.25 to 1.7 normal (or up to saturation)

H_2SO_4. . . . . 0.01 to 5 normal

Brightening agents 0.1 to 15 grams per liter

Temperature. . . . . Room to 120° F

Current density 20–300 amperes per sq. ft.

CLAIM 2. A method of electrodepositing bright copper, which comprises electrodepositing copper from an aqueous solution of copper sulfate and sulfuric acid, there being added to such solution a sulfurized sulfonated benzene substitution product nuclearly substituted with an alkyl group and capable of producing a bright deposit, said product being added in a sufficient concentration to produce a bright deposit.

6 Claims.

No. 2,425,359, August 12, 1947—Apparatus for Producing Tapered Electrodeposits—A. Zavarella, assignor to United States of America as represented by the Secretary of War.

Specialized problems in electroplating arise in the plating of interior surfaces of a gun barrel, particularly the chamber and bore surfaces thereof. For example, it has been found desirable to apply an electroplated coating extending only part of the distance into the bore from the chamber end of the barrel and to have the thickness of such partial bore plating gradually decrease along the bore. Such condition will hereafter be referred to as tapered plating. Furthermore, the extreme conditions of temperature, pressure and stresses to which the bore of a gun barrel is subjected by the firing of a cartridge requires that the absolutely highest quality of electroplated deposit be produced. Surface roughness, porosity and internal stresses in such plated deposits must be avoided. Accordingly the electrolytic solution must be strictly free from suspended matter and hence the anode

must be as insoluble as consistently possible with cost of such anode. The problems of production of a high quality plated deposit and insoluble anodes are of course not limited to plating the interior of gun barrels but common to many other applications of electroplating.

CLAIM 2. An apparatus for producing a tapered depth electroplated deposit on the interior surface of a hollow metallic cylinder comprising a rodlike anode, said anode being formed from electrically conducting material of uniform cross-section, the cross-sectional area of said anode being proportioned with respect to its resistivity to provide sufficient electrical resistance per unit length so that a normal electroplating voltage applied to only one end of such anode is reduced by voltage drop along the anode to substantially the threshold electroplating voltage at the other end of the anode, means for supporting said rodlike anode concentrically within the cylinder, means connecting only one end of said anode to the positive terminal of a source of electric current, means for connecting said cylinder to the negative terminal of the source of electric current, and means supporting said cylinder in an electroplating bath in such position that the gas liberated moves along the anode in a direction away from the point of current supply to the anode so as to assist in the production of an electroplated deposit tapering in depth along the length of the interior surface.

3 Claims.

No. 2,425,919, August 19, 1947—Method of Making Metal Molding Material—I. W. Cox, assignor to Cutler-Hammer, Incorporated.

A primary object of the invention is to provide a metal powder in flake form, which metal flakes are particularly adapted to cold weld to each other under relatively high molding pressure to provide formed articles of relatively high tensile strength.

The flake-formed molding powders of silver, copper, etc., produced in the manner disclosed herein may be used individually in the production of pressure molded contact tips and other articles.

CLAIM 3. The method of producing silver base electrical contacts, which comprises utilizing a body of substantially pure silver as an anode within a silver nitrate solution of suitable strength, electrolytically depositing films of said silver upon a multiplicity of polished stainless steel balls having cathode connections, effecting continuous movement of said stainless steel balls relatively to each other during the electrolytic action whereby the silver films on said stainless steel balls are mechanically compacted, increased in area, wrinkled and loosened with respect thereto and broken by said balls into particles in the form of fragments of spherical films, each fragment being bounded by a jagged edge especially adapting it for interlocking with similar fragments when confined in a die at molding pressure, intimately mixing said particles with a substantial but minor proportion of cadmium oxide powder, and then molding said mixture under pressure into electrical contacts of the desired form.

NOTE: The electroplating apparatus is similar in construction to an oblique type plating barrel.

3 Claims.

No. 2,426,416, August 26, 1947—Electroplating Nickel—E. W. Schweikher, assignor to E. I. du Pont de Nemours & Company.

The foregoing and other objects (of this invention) are attained by the use of a bath composition as follows:

Nickel chloride, grams per liter	225–275
Nickel sulfate, grams per liter	15–60
Boric acid, grams per liter	45–60
Metasulfobenzaldehyde, grams per liter	4–10
*p*H	2.0–4.0

The baths of this invention may be modified by the inclusion of additions known to benefit electroplating baths. The addition agents of the Lutz-Westbrook Patent 1,818,-229 may be used and there may similarly be used the addition agents of Schlotter 1,972,-693, Waite 2,112,818, Flett 2,195,409, Pine 2,029,386 and 2,029,387, Lynn, Harshaw and Long 2,198,267 and 2,198,268, and Harshaw and Long 2,125,229.

NOTE: The six claims simply show modifications in the proportions of the ingredients used in the bath cited above. 6 Claims.

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SAN FRANCISCO BRANCH

The regular monthly meeting in El Curtola Restaurant, Oakland, on August 14 was attended by seventeen members and three guests.

Dr. T. K. Cleveland, of the Philadelphia Quartz Company of California, Ltd., was the speaker of the evening. He gave a very cleverly illustrated talk concerning the general properties of cleaning baths which consist principally, it was learned, of caustic soda, soda ash, trisodiumphosphate, metasilicate, and orthosilicate. Each of Dr. Cleveland's listeners felt that the evening was very beneficially spent.

During the course of the business meeting, the subject of delinquent dues was taken up, and the motion made and carried to send a letter to each member who has not yet paid his dues, advising him that he is delinquent and suggesting that he mail his check to the secretary in order to avoid suspension.

Jack Hite, *Secretary-Treasurer.*

DETROIT BRANCH

The 1947–1948 season got off to an excellent start Friday, September 5 at the Hotel Statler with one hundred and fifty members and guests present.

Mr. Wilson expressed his appreciation for the fine work done by the various committees in arranging such a successful National Convention.

Fifteen new members were elected to membership. Mr. Fancher gave a report on the assembling of past issues of the Review; the members were pleased to note that the Hooker-Kresge Library, Detroit, now has all issues of The Monthly Review from 1923 to date and many of the *Proceedings*, although quite a few were still required to make the latter collection complete.

After a relaxing half hour of movies, *Life on the Western Marshes* and *Men of Gloucester*, Mr. George W. Jernstedt of Westinghouse Electric Corporation gave a progress report on periodic reverse plating. He explained that it wasn't a cure-all for our plating problems but was of considerable assistance in certain cases in obtaining a smoother, more dense deposit at higher current densities. He further explained that 10 to 50 per cent of the deposited metal was removed during the deplating period of the cycle. Curves were presented showing the effect of the two common methods of current reversal: by reversing the fields of the motor generator and by means of contactors at the plating tank. Mr. Jernstedt cautioned that the use of proper equipment for current reversal and the careful and complete checking of present generator equipment was essential to prevent damage to the installation.

A lively question and answer period followed, after which refreshments were served.

R. H. Dudley, *Publicity Chairman.*

LOS ANGELES BRANCH

The Los Angeles Branch picnic held on August 10 at Ladera Park proved to be a very enjoyable and entertaining function. Attendance was of the order of two hundred.

Chairman Jack Beall and his committee arranged for more than enough activities and refreshments. In the opening event, a softball game, the Platers beat the Supply Men, 13 to 11. D. N. Eldred, the only contestant able to maintain his equilibrium all the way over a slippery hillside course, won the Fat Men's Race; Fayne Board and Howard Woodward were in the place and show positions respectively.

Dick Luke and Betty Vasquez won the egg tossing contest. There were, in addi-

tion, numerous races and contests for the younger generation.

An unwarranted tragedy occurred near the end of the day. A picnicker left a Douglas Aircraft plant party nearby and returned shortly afterward in a small private plane. He buzzed the park several times until a wing snagged a treetop and the plane crashed in the park killing the pilot, a young woman and a two-year-old child. Three other persons were seriously injured. None were members of the A. E. S. group. STANLEY RYNKOWS and C. C. MCLAREN, members of our Picnic Committee, led in retrieving the victims from the debris.

DEAN D. WILLIAMS,
Secretary.

MELBOURNE BRANCH

A general meeting, presided over by VICE-PRESIDENT A. R. PRITCHARD, was held at the Chamber of Manufactures on June 23 when our President, MR. J. J. DALE, lectured most ably on "Electropolishing". Some forty members and visitors attended and evinced great interest in the paper and the discussion which followed. Particular reference was made to electropolishing stainless steels, pure aluminum, and nickel.

During the business session preceding the lecture, the Secretary presented a brief account of recent correspondence conducted with U. S. A. relating to the proposed revision of the Society's Constitution.

L. A. FRANCIS,
Secretary-Treasurer.

MELBOURNE BRANCH

The regular monthly meeting was held on July 28. This was preceded, as is our usual practice, by a committee meeting held at 4:30 P. M., following which committeemen adjourned to a nearby hostelry to revive their spirits after a rather dry session and, incidentally, to dine. This is mentioned because of the remarkable recuperative effect careful scientific ministrations had on MR. KEITH LEIGH who was the speaker for the evening. Mr. Leigh had suffered badly from laryngitis-cum-pharangitis-cum-whatmay during the committee meeting, but made a splendid recovery to present an interesting and clear account of "Ohm's Law and Its Importance to Platers" at the general meeting.

This provoked J. J. DALE to challenge all and sundry to show why, if the dire necessity were forced on us, it would not be better to discard the voltmeter rather than the ammeter. This challenge was, of course, intended to initiate discussion, and it succeeded admirably. A. H. CHESTERFIELD made suitable remarks defending the usefulness of the voltmeter, especially as an indicator of healthy or unhealthy conditions in plating solutions and electric circuits generally. Other members referred to the importance of voltage in black nickel plating, and to the conclusions which can be drawn if the voltage jumps, for instance, in alkaline tin plating or cadmium plating circuits. The lively discussion indicated that the meeting agreed with the contention that the ammeter was of greater use but considered the voltmeter very useful indeed.

L. A. FRANCIS,
Secretary-Treasurer.

PROVIDENCE-ATTLEBORO BRANCH

The regular May meeting was canceled out of respect to MR. CHARLES CHACE.

At a special business meeting on May 26, the following slate of officers for the coming year was elected unanimously:

President—P. B. LONSBURY
First Vice-President—J. P. CLARNER
Second Vice-President—R. L. MITCHELL
Librarian—A. J. MARSHALL
Secretary-Treasurer—E. A. PARKER
Sergeant-at-Arms—J. POTTER
Board of Managers—A. W. WOOD, R. D. MACLACHLAN, and J. T. HENRY.

The amended Constitution was discussed, and, in general, the recommendations to the Delegates were that no changes be made. The Delegates elected were P. LONSBURY, E. ALSFELD, and E. PARKER. Alternates were J. CLARNER, F. BOOTHROYD, and W. AVELAIR.

On July 28, another business meeting was held and plans for the coming year were outlined and discussed. Committees for a membership drive, educational features, and social functions were appointed.

EDWARD A. PARKER,
Secretary-Treasurer.

SYDNEY BRANCH

Twenty-six members and visitors attended the August 12 meeting.

During the business session one man was elected to membership. B. W. ARMSTRONG, J. R. GODFREY and F. P. HEARD were elected Delegates to the 1948 Convention with F. R. BELLENGER, T. WILSON and W. H. MILLWARD as Alternates.

The drive for back numbers of THE MONTHLY REVIEW and *Proceedings* for the Sydney Public Library met with very limited success due to the fact that the majority of the members have only been members of the Society for four years or less.

One of our members, MR. E. A. MURPHY, who was badly burned in a laboratory explosion early in April, was reported to be on the way to recovery although he has still to undergo a series of grafting operations.

The educational program for the evening was a discussion of the three lectures previously delivered before the Branch by F. B. STEVENS on "The Use of Poly-vinyl Chloride Rack Coatings", W. W. PATTERSON on "Effect of Impurities in Plating Solutions", and A. PEACH on "A Survey of the Plating Industry in England in Wartime and Peacetime".

Numerous questions were asked and answered including the following: "Does silver plate over a coating of cadmium decrease the protective qualities?" The general opinion was that the cadmium would bleed through the silver coating and a first coating of nickel was recommended. "What is the cause of corrosion of the antimonial lead lining of a new chromium plating bath?" In answer it was suggested that there was no protective film on the lead owing to the fact that the solution had not been worked since the bath was made up.

J. GODFREY, *Secretary.*

Referendum Vote on Dues Increase

In accordance with the instruction of the Delegates at the Annual Meeting June 26, 1947, the Executive Board has formulated a suitable wording of an amendment to the By-Laws to raise the dues $2.00 per member per year. The Law Committee has approved the wording and classification proposed by the Executive Board as printed below for the information of the Delegates and Members. Letters are being sent to the Delegates requesting their vote by letter ballot on this amendment and also to the Branch Secretaries informing them of this action. The proposed amendment is as follows (all changes in Italics):

"By-Laws, Part I, Supreme Society, ARTICLE VI, DUTIES OF BRANCH SOCIETIES, Section 3, Amount of Per Capita Tax.

(*a*) *Effective February 1, 1948, for new members and May 1, 1948 for members in good standing on December 31, 1947, a per capita tax of $4.70 per annum shall be contributed by each Branch* to defray the expenses of the Supreme Society.

(*b*) *Special Assessments*—For a stated purpose, a special per capita tax may be assessed on all Branch Societies which shall not exceed 10 per cent of the minimum dues provided that said special tax is approved by two-thirds of all members of the Supreme Society.

(*c*) *Per Capita Tax Basis*—The amount of the per capita tax shall be estimated upon the membership at the beginning of each quarter.

(*d*) *Per Capita Tax New Members*—The per capita tax of all members elected during any fiscal year shall be paid in the quarter during which they are elected.

By-Laws, Part II, Branch Societies, ARTICLE VI, DUES Section 1, *Minimum Dues.*

(*a*) The minimum annual dues shall be $8.00 per year and may be paid quarterly, semi-annually or annually.

(*b*) *New Members*—New members shall pay dues for the quarter in which they are elected and for the remaining quarters of that fiscal year."

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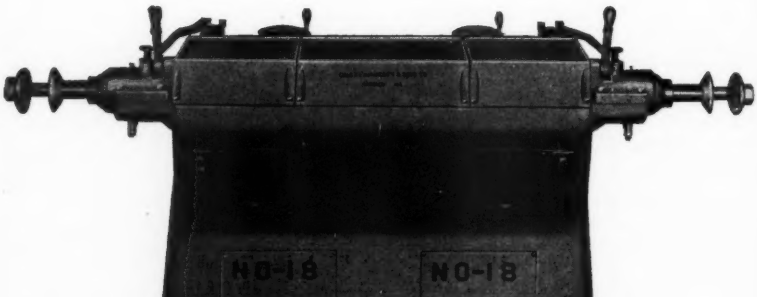
VARIABLE SPEED
LATHES



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C. B. Little, Newark, N. J.

Branches
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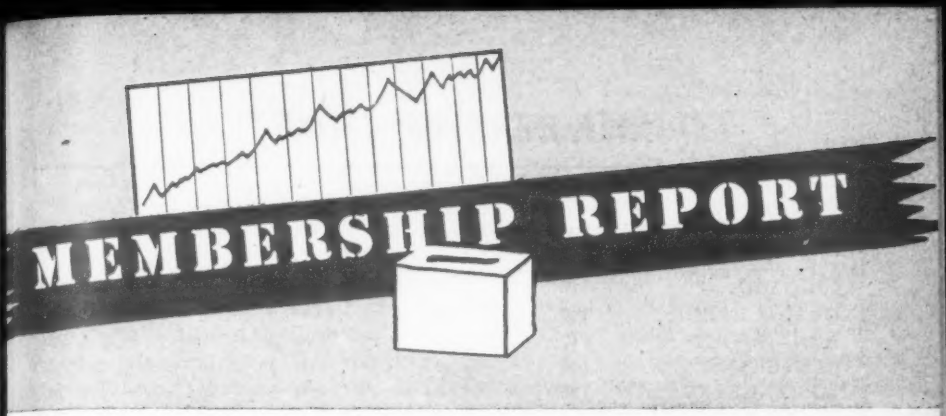


ARTHUR W. LOGOZZO

Chairman, Membership Committee

ELECTIONS

BALTIMORE-WASHINGTON BRANCH: Clifton Burton, Theophile Corbeels, James L. Garst, Jr., Archibald Jones, Jr., Alfred Pommer, Grayson B. Smith, Fred S. Tattersall

CHICAGO BRANCH: Fred Moses, W. H. Petersen, John H. Schneider, C. M., Shriver, George R. Strom, Robert K. Tucker, Earl H. Ward, A. Forest Wells, Jr.

NEW HAVEN BRANCH: Barnett F. Dodge, Sherman M. Goble, Jr., John J. Martin, Jr., Newell McDonald, Dinwiddie Coleman Reams, Jr.

PHILADELPHIA BRANCH: William S. Levine, George V. Morris, William R. Pfeiffer, Jr., Philip J. Prang, Jr., Burton B. White

PROVIDENCE-ATTLEBORO BRANCH: Robert A. Brown, E. L. Hoar, James L. Smith, Paul T. Smith, Michael F. Spirito, Doran R. Strouse

ROCKFORD BRANCH: Clarence H. Bailey, Jr., Wilbur F. McKay, Francis W. Scott, D. C. Woodruff

SAN FRANCISCO BRANCH: Warren C. McMahon

SYDNEY BRANCH: Lawrence L. Smith

REINSTATEMENTS

NEWARK BRANCH: W. G. Sheane

NEW HAVEN BRANCH: Michael De'Lie, John J. Kuzminski

TRANSFERS

James Weaver from Dayton Branch to Rochester Branch; Sherman Schroder from Los Angeles Branch to San Francisco Branch

SUSPENSIONS

CHICAGO BRANCH: H. F. Crewse, Harry Handzlik, George W. Kerns

COLUMBUS BRANCH: Eugene Catlon, Glenn Enlow, J. J. Prendergast, Stephen E. Timmons

NEWARK BRANCH: L. Hrusovsky

PROVIDENCE-ATTLEBORO BRANCH: Domenico Aquino, John Bonetti, Aime L. Chabot, A. J. Oliver, Joseph G. Rogorvus, Herbert E. Sjoquist

ROCKFORD BRANCH: Martin S. Hillbom, Cyril S. Key, Charles F. Lewis, Hollis A. Livingston, Harry S. Soper, Ray Williams

RESIGNATIONS

BALTIMORE-WASHINGTON BRANCH: J. F. Kreml

CHICAGO BRANCH: George G. Duncan

GRAND RAPIDS BRANCH: A. Vander Henst, Franklyn Snyder

LOS ANGELES BRANCH: A. R. Elschlepp

MILWAUKEE BRANCH: Marvin M. Skogen, Leo M. Wokosm

MONTREAL BRANCH: H. Goenert, D. M. Matheson, D. M. McLachlin

NEWARK BRANCH: Charles G. Piske

PHILADELPHIA BRANCH: J. W. Bardsley

PROVIDENCE-ATTLEBORO BRANCH: Donald F. Dixon, John F. Lowry, Halliday E. S. Thompson

DEATHS

PHILADELPHIA BRANCH: Benjamin Minkin

ST. LOUIS BRANCH: Clarence Mantei, F. J. Martin

MEMBERSHIP CHART

BRANCH	Membership May 1, 1947	New Members	Net Change in Membership	Per Cent Net Change
FIRST GROUP				
CHICAGO	410	28	+23	+ 5.6
GRAND RAPIDS	136	16	+ 6	+ 4.4
BRIDGEPORT	147	10	+ 5	+ 3.4
CLEVELAND	192	9	+ 5	+ 2.6
LOS ANGELES	196	6	+ 3½	+ 1.8
TORONTO	144	3	+ 1½	+ 1.0
PHILADELPHIA	218	12	+ 1½	+ 0.7
WATERBURY	139	1	.....	.....
BOSTON	160	..	.....	.....
HARTFORD	141	1	− ½	− 0.4
NEW YORK	259	7	− 5½	− 2.1
NEWARK	257	6	−16½	− 6.4
DETROIT	423	11	−36½	− 8.6
SECOND GROUP				
NEW HAVEN	114	5	+ 7	+ 6.1
SAN FRANCISCO	77	4	+ 4½	+ 5.8
ST. JOSEPH VALLEY	88	6	+ 5	+ 5.7
PITTSBURGH	126	10	+ 6½	+ 5.1
ROCHESTER	88	3	+ 3½	+ 4.0
BUFFALO	98	3	+ 2½	+ 2.5
TWIN CITY	95	1	+ 1	+ 1.1
BALTIMORE-WASH.	119	9	− 1	− 0.8
MILWAUKEE	124	3	− 1½	− 1.2
ST. LOUIS	96	..	− 2	− 2.1
DAYTON	90	1	− 2½	− 2.8
PROV.-ATTLEBORO	126	6	− 4	− 3.2
INDIANAPOLIS	103	16	−12½	−12.1
THIRD GROUP				
ADELAIDE	49	14	+13	+26.5
SYDNEY	78	10	+ 5	+ 6.4
TOLEDO	55	4	+ 3	+ 5.5
SPRINGFIELD	73	4	+ 3	+ 4.1
LANCASTER	38	2	+ 1	+ 2.6
SOUTHEASTERN	43	2	+ 1	+ 2.3
SYRACUSE	73	..	+ ½	+ 0.7
MELBOURNE	61	..	.....	.....
CINCINNATI	52	2	− 1	− 1.9
JACKSON-LANSING	49	..	− 1	− 2.0
ROCKFORD	64	4	− 2	− 3.1
COLUMBUS	35	4	− 1½	− 4.3
MONTREAL	60	..	− 3	− 5.0
TOTAL A.E.S.	4,896	223	+13	+ 0.3

Membership, Sept. 10, 1947 4,909

SUSTAINING MEMBERSHIP LIST

As of August 30, 1947

Acme Galvanizing, Inc., Acme Plating Co., Acme Plating Works, Acme Steel Co., Advance Plating Co., Ainsworth Mfg. Co., Aircraft Radio Corp., Alsop Engineering Corp., Aluminum Company of America, American Brass Co., American Cyanamid Co., American Emblem Co., American Instrument Co., American Optical Co., American Plating and Mfg. Works, American Radiator and Standard Sanitary Corp., American Rolling Mill Co., American Wire Fabrics Corp., American Zinc Institute, Apex Plating Co., Apollo Metal Works, Apothecaries Hall Co., Arnold, Schwinn & Co., Ardco, Inc., Arrow-Hart & Hegeman Electric Co., Auto City Plating Co., Automotive Rubber Co.

Bacon Felt Co., M. E. Baker Co., C. A. Barnes & Sons, Bastian-Blessing Co., Beaton & Corbin Mfg. Co., Bell Telephone Laboratories, Inc., Belke Mfg. Co., Berteau-Lowell Plating Works, Bethlehem Steel Co., Brown & Bigelow, Brown-Hutchinson Iron Works, Buckingham Products Co.

Canadian Hanson & Van Winkle Co. Ltd., Carey-McFall Co., Casco Products Corp., Charles Parker Co., Chase Brass & Copper Co., Chicago Electro-Platers Institute, Christie Plating Co., Chrome-Rite Co., Chromium Corp. of America, Chromium Process Co., Chrysler Corp., Cinch Mfg. Corp., Cleveland Graphite Bronze Co., Clinton Co., C. G. Conn Co., Ltd., Corona Corp., Cowles Detergent Co., Crown Cork & Seal Co., Crown Rheostat & Supply Co.

Darco Corp., Daystrom Corp., Dayton Rustproofing Co., Detrex Corp., A. B. Dick Co., Divine Brothers Co., Dixie Electro Plating Co., Doehler-Jarvis Corp., R. R. Donnelly & Sons Co., Dow Chemical Co., E. I. du Pont de Nemours & Co., Dura Co., Dura-Chrome of Chicago, Inc.

Eastman Kodak Co., Eaton-Clark Co., Eaton Mfg. Co., Electric Auto-Lite Co., Electrolux Corp., Electrolux (Canada), Ltd., Ellmore Silver Co., Empire Electro Plating Supplies Corp., Enthone, Inc., Erie Plating Co.

Federal Mogul Corp., Federal Telecommunication Laboratories, John H. Feeley, Flour City Ornamental Iron Co., Ford Motor Co., Formax Mfg. Co., Frigidaire Div.—General Motors Corp., E. R. Frost Co.

Gemex Co., General Chemical Co., General Electric Co., General Motors Corp., Gerity-Adrian Mfg. Co., Gillette Safety Razor Co., Gordon Mfg. Co., Gorham Mfg. Co., Graham Plating Works, Great Lakes Plating Co., Frederick Gumm Chemical Co.

Hamilton Watch Co., Hammond Machinery Builders, Inc., A. H. Hannon, Hanson-Van Winkle-Munning Co., Harshaw Chemical Co., Haviland Products Co., Heil Process Equipment Corp., Hodecker Brothers, Hohman Plating Co., Houdaile-Hershey Corp., Hub Plating Works, Hudson Motor Car Co., Hunter Pressed Steel Co., Hy-Grade Plating Co.

Industrial Filter and Pump Mfg. Co., International Business Machines Corp., International Nickel Co., International Silver Co.

F. L. Jacobs Co.

Kelite Products, Inc., Kelly Plating Co., Kings Electroplating Co., Knape & Vogt Mfg. Co., Kocour Co., Kohler Co., Kollsman Instrument Div.—Square D Co., Kuehne Mfg. Co.

Lasalco, Inc., Lea Mfg. Co., Leeds & Northrup Co., Chas. F. L'Hommedieu & Sons Co., Lionel Corp.

Maas & Waldstein Co., W. D. MacDermid Chemical Co., MacDermid, Inc., P. R. Mallory & Co., Manderscheid Co., Matchless Metal Polish Co., Mattatuck Mfg. Co., Maxson Co., McGean Chemical Co., McKinney Mfg. Co., Meaker Co., Mechanical Plating Co., J. E. Mergott Co., Metal Finishers, Inc., Metal Industry Publishing Co., Metal Mouldings Corp., Metal Process Corp., J. C. Miller, Minneapolis-Honeywell Regulator Co., Mitchell-Bradford Chemical Co., Modern Plating Co., Moore Drop Forging Co., Motor Products Corp., Munning & Munning, Inc., Mutual Chemical Co. of America.

George L. Nankervis Co., Nash-Kelvinator Corp., National Aniline Div., Allied

Chemical & Dye Corp., National Brass Co., National Cash Register Co., National Lock Co., National Screw & Mfg. Co., Nelson and Long, New England Buff Co., New Jersey Zinc Co., G. J. Nickolas & Co., Noblitt-Sparks Industries, Inc., Northwest Chemical Co., Nutmeg Chrome Corp.

Oakite Products, Inc., Oneida, Ltd.

Packard Motor Car Co., Pape Electro Plating, Inc., Parker Rust-Proof Co., Parker-Wolverine Div. of Udylite Corp., Parts Mfg. Co., Pennsylvania Salt Mfg. Co., Perma-Line Rubber Products Corp., Philadelphia Rust-Proof Co., Plating Products Co., Platers Supply Co., Precision Castings Co., Products Finishing.

R. C. A. Victor Div. of Radio Corp of America, Richard I. Reid, Remington Rand, Inc., Reo Motors, Inc., Reynolds-Robson Supply Co., Roberts Rouge Co., Royal Plating and Polishing Co.

St. Louis Metalcrafts, Inc., Sargent and Co., Scoville Mfg. Co., J. P. Seeburg Corp., E. E. Seeley Co., Seth Thomas Clocks Div. of General Time Instruments Corp., Seymour Mfg. Co., Schick, Inc., J. J. Siefen Co., Silverman Brothers, Speakman Co., Spectranome Plating Co., Standard Oil Co. (Indiana), Standard Plating Works, Standard Steel Spring Co., Stanley Works, Frederic B. Stevens, Inc., Sturgis Products Co., George A. Stutz Mfg. Co., Superior Plating and Rust Proofing Co., Superior Steel Corp., Surety Electroplating Co., Sylvania Electric Products Inc.

Talon, Inc., Taylor Instrument Companies, Thomas Brothers, Inc., Thomas & Son Co., Thomas Steel Co., Trico Products Corp.

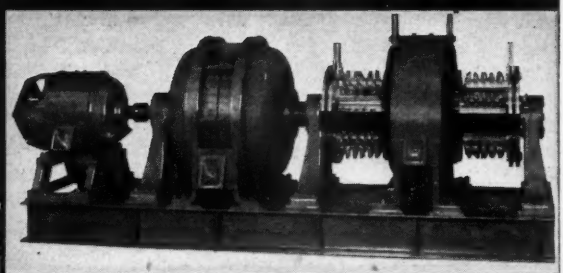
Udylite Corp., Uncas Mfg. Co., Union Hardware Co., United Chromium, Inc., United Platers, Inc., United States Time Corp., United States Spring & Bumper Co., Universal Button Fastening and Button Co.

Van Der Horst Corp. of America.

A. T. Wagner Co., Wagner Brothers, Wald Mfg. Co., R. Wallace & Sons Mfg. Co., Walton & Lonsbury, Waterbury Buckle Co., Waterbury Companies, Inc., Waterbury Plating Co., W. W. Wells, Ltd., Western Electric Co., Western Rustproof Co., Westinghouse Electric Corp., Wheeler Industries, Inc., Whitney Blake Co., Willys-Overland Motors, Inc., Winchester Repeating Arms Co., Winters & Crampton Corp., Wolverine Brass Works, Wyandotte Chemicals Corp.

Yankee Metal Products Corp., Youngstown Sheet and Tube Co.

COLUMBIA MOTOR GENERATORS



FOR ELECTRO-PLATING

Columbia Generators embody every feature essential for dependable, 24-hour operation. They are built for electroplating service in sizes of 6 to 20 volts, 500 to 20,000 amperes, for anodic treatment of aluminum in sizes of 40, 50, and 60 volts, 500 to 3,000 amperes. Columbia Generators for other electrolytic processes range from ½ to 250 KW, 100 to 40,000 amperes, 6 to 60 volts. Write for full information.

COLUMBIA ELECTRIC MFG. CO.

4519 HAMILTON AVE., N.E. CLEVELAND 14, OHIO

THERE'S

NO CYANIDE IN UNICHROME COPPER

. . . so you get **SAFETY** as well as **SAVINGS!**

LARGE STOCKS OF CYANIDES, even when you can get them, are always a plant hazard—require the utmost care in both storage and use. With non-cyanide Unichrome Copper, you cut down the quantity of cyanide needed in your plant and also get a safe plating bath.

And, this is just one of *five* outstanding advantages you get in mildly alkaline Unichrome Copper. That's why we say: compare it with any other process, and we believe you'll specify Unichrome Copper every time! Write your nearest Unichrome office today for our helpful technical bulletin.

BUFFING TIME IS CUT—often eliminated entirely—because Unichrome Copper gives you a *smoother* deposit. And because it's a *fast* process, you save time in the tank as well. Only when you save *both* ways do you really lower plating costs.

FEWER ANODES required, because the bath keeps them free of oxides even at high current densities. Why tie up extra money when Unichrome Copper has 100% anode efficiency—with 50% to 75% fewer anodes?

CLEAN DEPOSITS never need activation. With no brighteners, no wetting agents used, Unichrome deposits come out clean, ready for the nickel cycle without special treatment.

HELPFUL SERVICE—Unichrome Copper is simple to maintain, seldom gives trouble. But should the need arise, you can always count on prompt help from our engineers and analytical laboratories.

Be sure to see the United Chromium display at the Detroit Industrial Finishing Exposition, June 23 to 27. Booths 101, 102, 103.

UNICHROME

PROCESSES AND MATERIALS FOR SURFACES THAT SURVIVE

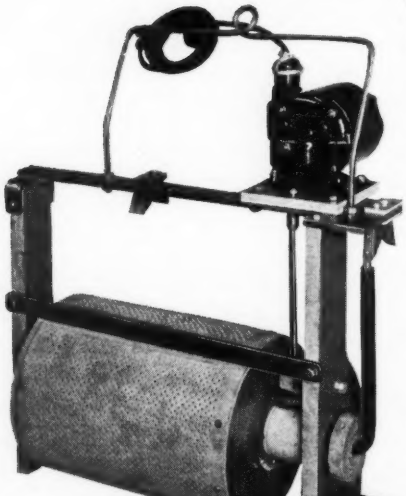
UNITED CHROMIUM, INCORPORATED • 51 E. 42nd St., New York 17, N.Y.

Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio • Los Angeles 11, Cal.

Faster, More Uniform Plating

LASALCO'S UTILITY BARREL PLATER OFFERS SPEED *PLUS* ECONOMY

Extremely versatile, Lasalco's Utility Barrel Plater can be used for plating small lots of varying grades and types of material, regardless of process, faster, more uniformly and at less cost than any other equipment in its price range. Check these important features:



- Can be hung in any plating tank on the cathode rod and operated from the nearest light socket.
- Easy to load and unload because of its extreme portability.
- Nothing plates but the load — no "tree-up" on the cylinder.
- Less dragout loss because barrel revolves as it is lifted from solution.
- Hand shifting of cylinder is entirely eliminated.
- Rugged, durable, long-life operation is guaranteed by its heavy canvas base Bakelite construction.
- Specially designed, sturdy, geared-type motor.
- Cylinder sizes: No. 1—Dia. 6" x 12" long; No. 2—Dia. 9" x 12" long.

Hundreds of plating shops are finding Lasalco's Utility Barrel Plater a real time saver and profit-maker.

MEMO
Call a Lasalco Engineer

Write today for complete information.

LASALCO, INC.

2818-38 LA SALLE STREET ST. LOUIS 4, MISSOURI

(*Continued from page 1140*)

Various important aspects of procedures were discussed at this meeting which was attended by eighteen members of the Newark Branch. It was decided that the choice of technical subjects to be discussed and speakers be left to the discretion of the Educational Committee. The chairman of the Industrial Exhibits Committee presented a number of interesting ideas on how the main exhibits should be handled. A special effort will be made to obtain a complete set of Branch Exhibits, and it is hoped that the Branches will give their fullest cooperation to this end.

WILLIAM F. BRUHNS, *Publicity.*

New Paper Awards Committee

President Huston announces the appointment of the following to the Committee on Paper Awards:

DR. HAROLD J. READ, *Chairman*
MR. R. O. HULL
DR. W. A. WESLEY

The Committee will judge the technical articles published in THE MONTHLY REVIEW during the year 1947–1948 and the papers presented at the 1948 Annual Convention in Atlantic City. Not less than four awards are at its disposal: The Herminie Dorothea Proctor Award of $100.00 and the Founders' Gold Medal for convention papers, and a $50.00 Award and the A. E. S. Gold Medal for articles in THE MONTHLY REVIEW.

Sydney (Australia) Branch Member Visits National Office

Kurt J. Hacker visited the Secretary's office on August 20, 1947, in order to obtain information on technical matters pertaining to metal finishing and assistance in the development of a course of instruction in electroplating which he hopes to give upon his return to Australia.

Mr. Hacker is connected with the firm of Hacker Silver Plate Manufacturing Company, 180 Commonwealth Street, Sydney, Australia. He attended Sydney Technical College, Chemistry Department, and took courses available there in electroplating. It is his hope to return to that institution and to teach courses on this subject.

Thank You

TO THE EDITOR:

"The writer was very much pleased to read in the August number of THE MONTHLY REVIEW that he had been made an honorary member of the American Electroplaters' Society, and wishes to thank all who took part in voting him this honor.

"It brings back fond memories of the times—many years ago—when the writer met with a few platers in New York City to discuss forming such a Society. Little did we think at that time that the organization would meet with such success—to become even world-wide.

"I am enclosing herewith a few suggestions for a new name for THE MONTHLY REVIEW.

"Thanking you all again, I am

Yours sincerely,
E. M. STEPHENSON,
Hartford Branch."

"YANKEE BRAND"

PROGRESSIVELY BETTER ABRASIVE COMPOUNDS

Tailored to fit all finishing requirements.

Inquiries respectfully solicited

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Manufacturers
BUFFING COMPOSITIONS
FOUNDRY FACINGS
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for Economy, Efficiency and Quality

the No. 1 Buffs are

SHURFLOW
Bias Buffs

The way to judge the Superiority of buffs is to compare . . . and when you do, you will discover that, all around, the "American-Made" Shurflow Bias Buffs are No. 1 for Economy, for Efficiency and for Quality. The material and workmanship cannot be beat! Also made in "Flame-Proof" cloth.

3 SHURFLOW BIAS BUFFS

10 ORDINARY BUFFS!

WE INVITE YOU to visit our Booth No. 1425 at NATIONAL METAL CONGRESS AND EXPOSITION in International Amphitheatre, Chicago. October 18 thru October 24.

AMERICAN BUFF COMPANY

2414 SOUTH LA SALLE STREET, CHICAGO 16, ILLINOIS

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INDUSTRY NEWS

WANTED

Chemist or chemical engineer who is sales minded, for No. 1 assistant position with national organization furnishing specialized chemicals for metal cleaning, finishing, etc. Company at present is well staffed with technical men and has a good field selling organization. Needs an individual to help coordinate efforts of both groups. Should be familiar with plating and finishing operations in metal working plants. Some sales or technical field service experience desirable because it will be necessary to work with salesmen and customers. Age 28–35. Location, midwest. Write fully and in confidence to Box MR 10-A, THE MONTHLY REVIEW, P. O. Box 168, Jenkintown, Pa.

New Water-Shedding Liquid for Drying Metals

Enthone, Inc., 442 Elm Street, New Haven, Conn., Dept. MR, has announced the development of a new product called "*Hydrex*".

This product is a thin mobile liquid that sheds water from the surfaces of metals. It has very high penetrating power to enable it to displace water from blind holes and crevices. After the water has been displaced, the work is removed from the liquid and the solvent evaporates leaving a water-free surface with some rust-inhibiting properties.

The liquid is recommended for drying of plated work to prevent staining such as chromium plate, silver plate or cadmium. Spots that normally remain on the work from solids dissolved in the water, such as chromic acid or from the normal solids present in hard water, are removed. The water separates to the bottom of the liquid and can be drawn off periodically.

Full details regarding application and uses of the product are available from the manufacturer.

New Oiless Paint

A revolutionary new paint, made from a water dispersion of a synthetic resin instead of customary drying oils, dries in less than half an hour without odor, yet possesses the durability and finish of high class oil paints, according to a joint announcement by Cyril S. Kimball, vice-president of the New York chemical consulting firm of Foster D. Snell, Inc., and George O. Morrison, technical director of Shawinigan Products Corporation, resin manufacturers, New York.

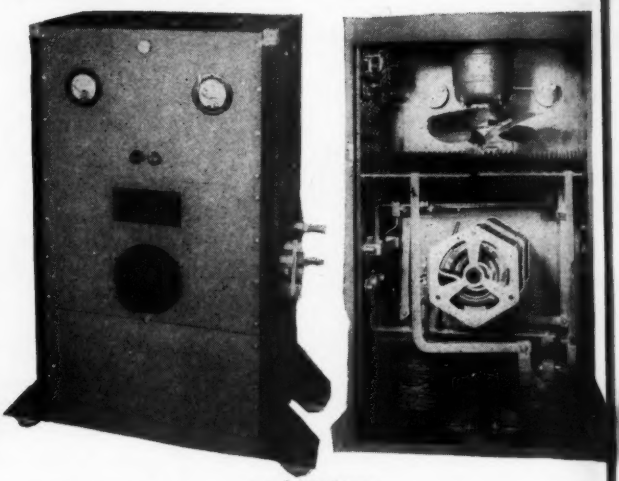
The pigment and poly-vinyl resin are dispersed in water with one per cent or so of a synthetic wetting agent. The product can be brushed or sprayed on in the same manner as an ordinary paint. The applied paint dries in less than half an hour to yield a hard film. The brief drying process from the user's point of view is the rapid conversion of a liquid dispersion by the evaporation of water into a continuous solid film.

New Warehouse for H-VW-M

The *Hanson-Van Winkle-Munning Company* of Matawan, N. J., announces the completion of a new Stratford, Conn., office and warehouse at 382 Seymour Street, Stratford, Conn. The building is a steel, concrete and brick structure of modern construction, one and two stories in height with a total floor space of 6,640 square feet. Its purpose is to provide a stock of electroplating

DEPENDABLE POWE

Selenium Rectifiers



Model TPC 5025

New improved selenium rectifiers designed especially for continuous performance at maximum efficiency. At no increase in cost we can now offer new modified units built to take severe punishment not only from the plating tank but from the extremely adverse climatic conditions in the plating room. Rapid Electric Selenium Rectifiers are given a 25 per cent overload test before leaving our factory and are guaranteed to give continuous satisfactory service.

Custom-built units of any size power ratings will be designed and constructed as per your specifications.

All standard models are available for immediate delivery. Please write for complete information.

Model 5510

SINGLE PHASE 110/120V. 50/60 CY.		
MODEL NO.	D. C. AMPS	D. C. VOLTS
1214	15	0-15
5510	50	0-10
2239	150	0-8
MODEL NO.	D. C. AMPS	D. C. VOLTS
S P C 3030	300	0-8
T N C 5050	500	8
T P C 5025	500/250	0-8/0-16
T N C 1050	1000/500	8/16

RAPID ELECTRIC CO

2847 Middletown Road — Bronx 61, N. Y. C., Dept.

and polishing supplies and equipment for quick service and delivery to customers in New England.

Offices have been provided in this building for the company's Connecticut representatives, *George G. Knecht* and *Robert E. Creamer* and for *Walter J. Jurman*, warehouse manager.

Dr. Taylor with Wyandotte

Dr. A. Lloyd Taylor, formerly Vice-President in Charge of Research and Development for H. L. Shaw and Sons of Portsmouth, N. H., and Boston, Mass., has accepted a position as Research Supervisor in the *Wyandotte Chemicals Corporation Research Laboratories* where his experience will be applied in the field of industrial detergents. In addition to his work on detergents in his last position, Dr. Taylor has had many years' experience in the same field as Director of Research for Oakite Products and as Director of the Department of Chemistry for Pease Laboratories, New York.

New Line of Chain Hoists

The Chester Hoist Company, Lisbon, Ohio, announces a new line of *Differential Chain Hoists* made to meet present-day severe punishment with high rate safety and within a normal price range.

It is a hoist of exceptionally few parts, therefore lighter in weight without sacrifice of any strength, and more portable. It holds its load at any point, will not self-lower. Made in ¼, ½, 1 and 1½-ton capacities.

Battelle Streamlines Organization

To assure that the full talents of its growing staff will continue to be used on each and every industrial problem, *Battelle Institute* has named six new assistant directors.

The new assistant directors—all veteran members of the Battelle staff—are *Dr. Frank C. Croxton*, *Dr. Clarence H. Lorig*, *Dr.*

FELT DOES IT BETTER

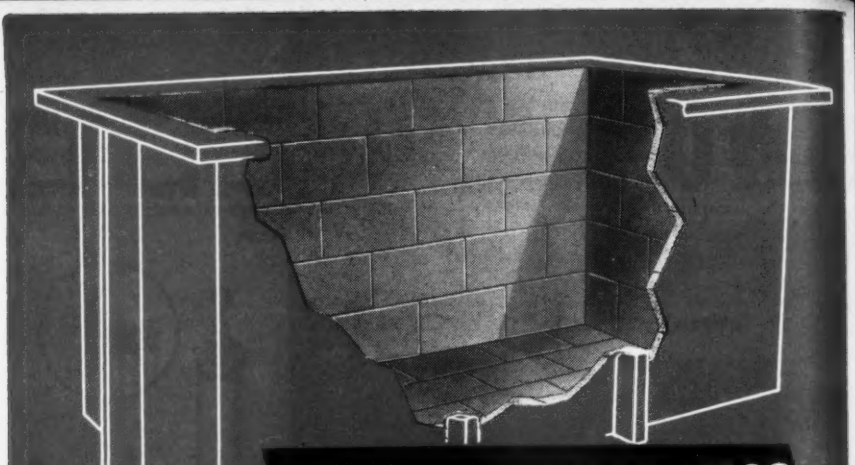
PARAMOUNT BRAND

FELT WHEELS

Quality • Better Work • Uniformity

Order PARAMOUNT BRAND Felt Wheels from your supplier. Also, bobs and sheets whenever you need them.

BACON FELT CO. Winchester, Mass.
Established 1824
"America's Oldest Felt Manufacturer"



Acid-proof **TILE LININGS FOR CHROMIUM PLATING TANKS**

Chrome plating authorities generally agree that acid-proof tile or brick-lined steel shells make not only the best but the least expensive chrome plating tanks.

For example, Chromium Corp. of America says: "We have used your acid-proof tile and acid-proof cement as lining for our chromium plating tanks for five to seven years. We find the lining proof against deterioration and it has the advantage of eliminating any chance of stray currents."

You, too, will find "U. S." acid-proof brick and tile linings your best bet for chromium plating tanks.

YOU CAN INSTALL "U.S" TILE LININGS YOURSELF

You can handle the job with your own men by using our detailed, easy-to-follow directions. We'll provide the necessary acid-proof tile and our Vitric-10 quick-setting acid-proof cement.

FREE BOOK

The most complete book on acid-proof masonry construction ever prepared. 56 pages full of facts, helpful information, design details, etc We ll be happy to send you a copy, absolutely free. Write today and ask for your copy of Bulletin 812.

OR WE CAN FURNISH THE COMPLETE TANK INSTALLED

If you prefer we will handle the complete job from the fabrication of the tank shell to the installation on your floor. Send us a rough sketch. Our engineers will be glad to help on design details.

U. S. STONEWARE

Since 1865 • Akron, Ohio

Howard W. Russell, Ralph A. Sherman, Clarence E. Sims, and *John D. Sullivan.*

According to Battelle Director *Clyde Williams,* the action represents the culminating step in the development of the unique plan of research organization under which Battelle operates. Under this plan, departmental lines are merely nominal, and each research problem that the Institute undertakes is a problem for joint attack by all qualified members of its staff.

American Nickeloid Adds to Sales Force

Expansion of sales representation has been made by the *American Nickeloid Company,* Peru, Ill., manufacturer of pre-plated metals, with the establishment of a New England sales office at Beverly, Mass. In charge of this sales division is *J. F. Schoellhorn,* formerly of the company's Chicago office.

Sales representatives have also been added in two other American Nickeloid offices. *Norman D. Standal* has joined the Seattle, Wash., office, where *Hughson and Merton* are the representatives. *William Watts* and *John Richards* have joined the Chattanooga, Tenn., office, where *C. R. Eaves and Company* are the representatives.

Two New Small Selenium Rectifiers

Richardson-Allen announces the addition to their line of two new small, low-priced selenium variable rectifiers designed especially for jewelry manufacturers and laboratory work.

Model D-513A is a 4-ampere, 6-volt rectifier that operates on 115 AC single phase 50–60 cycle current. Its dimensions are 7.5 x 4.5 x 5 inches and it is compactly designed for bench or wall attachment.

Model D-514A is a 10-ampere, 8-volt rectifier that operates on 115 AC single phase 50–60 cycle current. Its dimensions are 8 x 10 x 6 inches. This small compact rectifier includes a voltmeter and ammeter.

New Booklet on Finishing Magnesium

Superior Magnesium Castings announces the publication of a new booklet titled "Machining and Finishing Magnesium Castings". The topics covered include: *Tools,*

ZINC PLATERS!

Cleanse & Purify your Zinc Solution with

McKeon's

Zinc-Brite

TRADE MARK REG'D.

Make your Zinc Bright

Information free—wire collect

Sulphur Products Co. Inc.

Greensburg 9, Pa.

The Big Name in the Plating Industry . . .

MICCROTAPE

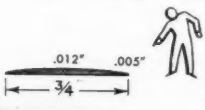
RACK COATING

for BETTER PROTECTION • BETTER INSULATION • BETTER STOP-OFF

MICCROTAPE is a patented extruded tape with tapered edge making it easier to apply and permits smoother overlapping, closer fit in grooves and around shoulders. This is an exclusive feature and shop records throughout the plating industry prove the many advantages of using Miccrotape over any other similar rack coating.

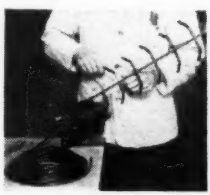
● No heat sealing necessary • Unaffected by 190° plating baths and boiling cleaning solutions • High in dielectric strength • Remains tough and permanently elastic • As selective stop-off may be used 4 or 5 times before discarding • Excellent for repairing any damaged rack coating including rubber.

Write for details about these two Miccro Products



MICCROTUBE

MICCROTUBE—An extruded tubing with the same outstanding physical and chemical characteristics as Miccrotape. Speedily applied to straight and bent contact wires, also round splines. Will fuse with Miccrotape into a perfect leakproof coating. Available in inside diameters from 1/16" to 1".



MICCRO Products

Developed and Manufactured by Experienced Platers

MICHIGAN CHROME and CHEMICAL COMPANY

6340 EAST JEFFERSON AVENUE • DETROIT 7, MICHIGAN

Cutting Fluids, Distortion, Finishing, and Decorative Finishing. Copies can be secured free upon request by writing Superior Magnesium Castings, 140 Banker Street, Brooklyn 22, N. Y.

Pull-off Plastic Coating

"*Liquid Envelope*" is sprayed on the clean spray booth in a film .002 inch thick. When booth is ready for cleaning, the coating is peeled off right down to the metal in large sheets carrying with it all accumulated paint, lacquer and spray-dust. A 6 x 6 foot booth can be stripped clean in less than five minutes, and recoated in the same time. No scraping is required, the plastic film peels as easily and simply as a banana. The sample gallon unit includes a quart of solvent for cleaning spray-gun equipment. All plants having spray booths will welcome this incentive to faster production while effecting marked savings in operational costs. Write *Better Finishes and Coatings, Inc.*, 268 Doremus Avenue, Newark 5, N. J., for initial trial information and operational data.

A. W. Milleisen American Buff Company New England Representative

American Buff Company of Chicago announces the appointment of *A. W. Milleisen* as its new New England representative.

A. W. Milleisen

Al Milleisen is a veteran of World Wars I and II, having served overseas in both. He is a Penn-State College graduate in metallurgy. Prior to his present association with American Buff Company, Mr. Milleisen was sales engineer for New England Metallurgical Corporation of Boston, Mass.

FOR 25 YEARS

THE SIGN OF QUALITY

HARRISON

4A

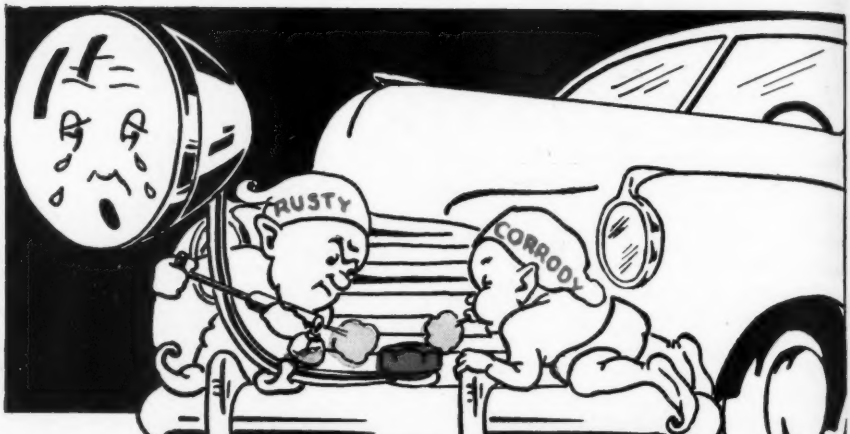
BUFFING AND POLISHING COMPOUND

"TAILOR MADE FOR YOUR PRODUCT"

Our twenty-five years experience, exclusively in buffing and polishing compounds, assures you of the *RIGHT* compound for the *RIGHT* metal.

HARRISON & COMPANY, Inc.

Dept. 2 HAVERHILL, MASS.



Does a RUSTY and CORRODED FASTENER spoil your product quality?

Rust and corrosion play hob with a product's quality when they're allowed to step in and go to work on untreated fasteners. If you're faced with this kind of a problem, then Luster-on* is your answer.

Nuts, bolts, screws or wing-nuts, basket or barrel zinc-plated and treated with Luster-on*, are permanently brightened, made positively rust- and corrosion-resistant. Once Luster-on* dipped, there's no danger of their spoiling the over-all beauty and utility value of your product.

Luster-on* gives fasteners of every kind a bright new lease on life. Send the coupon and a sample for processing today. See the results for yourself. There's no obligation.

20 *REG. U. S. PATENT OFFICE

THE Chemical CORPORATION
54 Waltham Ave., Springfield 9, Mass.

THE CHEMICAL CORPORATION
54 Waltham Ave., Springfield, Mass.

Please send me full particulars about Luster-on* bright dip for zinc-plated surfaces. I am (am not) sending sample for free dip. No obligation, of course.

Name_____

Firm_____

Address_____

Monthly Review October

Duriron Manual

A complete *12-page manual* on the corrosion resistance, proper installation and use of Duriron acid proof sinks, sink strainers, traps, and sanitary pipe and fittings has been issued by the *Duriron Company, Inc.*

A 12-page data bulletin, known as *Price List H*, has also been issued. It lists all items available for prompt delivery.

Both manual and bulletin will be mailed to anyone who writes to The Duriron Company, Inc., Dayton, Ohio, and asks for Bulletin 703.

Polishing Booklet Available

"*Setting-up Metal Polishing Wheels and Belts*" is the title of a 40-page booklet which the *Norton Company* has made available. It discusses aluminum oxide abrasives, proper preparation of glue, and the setting up of polishing wheels and abrasive belts. A table of grain selection for various polishing operations is included.

A copy may be obtained by writing to the Norton Company, Worcester 6, Mass.

Brown Names New Sales Engineers

The assignment of a new group of sales engineers to the branch and regional offices of the *Brown Instrument Company* has been announced.

Edgar Andrews, Atlanta; *Nilsson S. Bassett*, Boston; *R. J. Bierman* and *Clarence W. Swanson*, Minneapolis; *Edward J. Bryne*, Houston; *Warren H. Erftenbeck*, Buffalo; *David J. Fair*, Dallas; *William R. Hamaker*, Detroit; *Charles F. Hintz*, Chicago; *Lawrence W. King*, New York; *Donald W. Larcen*, Milwaukee; *John F. Smith*, Tulsa, Okla.; and *Andrew H. Albee*, Cleveland, Ohio.

New Buffing and Polishing Unit

Standard Electrical Tool Company, 2477 River Road, Cincinnati 4, Ohio, announces a two-motor buffing and polishing machine with overhang construction.

The machines, available in sizes to include 2, 3, 5, 7½, 10, 15 and 20 h.p. motors, at spindle speeds of the user's selection, are also available with "Speedial" control on each spindle to provide infinitely variable speeds between 1,500 and 8,000 r.p.m.

ORDER NOW

YOUR COPY OF THIS POPULAR VOLUME

"THE FUNDAMENTALS OF ELECTROCHEMISTRY AND ELECTRODEPOSITION"

by Samuel Glasstone

Third Edition

$2.50

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There are not many copies left, so it's first come, first served! Send your order, with check, to:

AMERICAN ELECTROPLATERS' SOCIETY

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Jenkintown, Pa.

DIVINE SEWED PIECED BUFFS

VERSATILE — ECONOMICAL — AVAILABLE

Spirally sewed, 3/8", 1/4", in a variety of grades—Bleached, Unbleached, Colored . . . uniform in quality . . . excellent in finish . . . built in balance . . . full diameter . . . economical to use. Since 1892 the standard of quality in pieced buffs. Available for prompt shipment.

Polishing and buffing equip ment is our specialty. Write us about your problems . . . we have a product to meet your every need!

Divine Brothers Company

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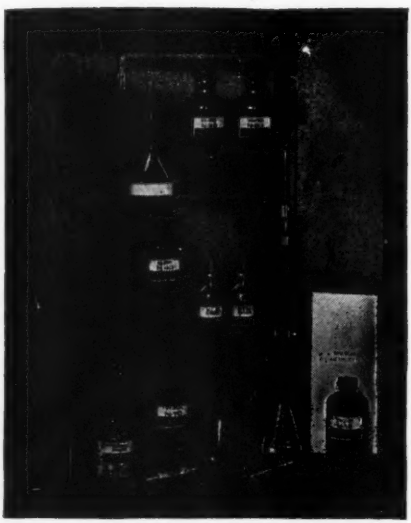


CHROMIUM NICKEL COPPER

Simple test sets for aid in controlling plating and other solutions.

Write for literature.

KOCOUR CO.

4801 S. ST. LOUIS AVE.
CHICAGO 32, ILL.

Specify Kocour Sets from your supplier.

Electrostatic Painting

Forty-page N.F.B.U. Research Report No. 6 (Publication M28) is a "*Hazard Survey of a High-Voltage Electrostatic Process for Spray-Deposition and Dip-Detearing of Paints*". An appendix, "*Resume of Reports Relative to Electrical Shock Hazards*", is included along with a small number of illustrations. Obtainable from *National Board of Fire Underwriters*, 85 John Street, New York 7, N. Y.

Shop Utensils for Handling Corrosives

Unbreakable shop utensils for handling acids, alkalies, and other corrosive solutions are manufactured from reinforced perforated metal completely covered with a ⅛-inch seamless rubber coating that protects them from the action of chemicals and protects solutions from contamination. Coatings of soft or semi-hard natural rubber or synthetics may be had.

The line includes pails of 3 and 5-gallon capacity, a 2-quart dipper, 10-inch funnel, and measures of 2, 4, and 6-quart capacity. Special sizes and shapes are available to specifications. Contact *Automotive Rubber Company, Inc.*, 8623 Epworth Boulevard, Detroit 4, Mich.

Emulsifier

Two 4-page bulletins describe "*Actusol*", a non-caustic, non-alkaline cleaner with powerful grease solvent properties for use in cleaning certain types of machinery, tools and parts in various industries. The second bulletin is an "applications analyzer" intended to assist prospective users to determine whether or not "Actusol" is of value to them in solving their cleaning problems. Write to *Du Bois Company*, 1120 W. Front Street, Cincinnati 3, Ohio, for your copy.

H-VW-M Adds to Staff

The Hanson-Van Winkle-Munning Company, Matawan, N. J., announces the appointment of *Walter A. Cary* to its sales and service staff. Mr. Cary is a graduate of Fordham University with the degree of B.S. in Chemistry and has had wide experience in the plating industry. He has taken an extensive training course at the Matawan plant and has now been assigned to the New York State Territory.

LARGE CASTINGS—SMALL METAL PARTS—LONG THIN PIPES ARE THOROUGHLY AND QUICKLY CLEANED IN A

BLAKESLEE

SOLVENT *Vapor* DEGREASER

G. S. BLAKESLEE & CO.

BLACOSOLV DEGREASERS AND SOLVENT

NIAGARA METAL PARTS WASHERS

G. S. BLAKESLEE CO., CHICAGO 50, ILLINOIS · New York, N. Y. · Toronto, Ont.

Start with a *Good Finish*

Cleaning Compounds formulated by The Puritan Manufacturing Company provide platers with the necessary requirements for satisfactory plating. PURICO Compounds eliminate superfluous operations . . . save time and labor . . . minimize rejections . . . speeds up production.

Wonderbar

A pre-saponified Tripoli bar composition for economical buffing. Soluble in mild alkali, Wonderbar rinses from intricate patterns without requiring degreasing machines. *Makes tedious manual scrubbing unnecessary.*

Pur-Bur

Solves the tough and complex burring problem. Applied to the wheel, Pur-Bur is self-lubricating to prevent friction, embrittlement, or burned surfaces. Possesses high cutting qualities for rapid removal of burrs and fins without dangerous results.

Purico ZN

A black oxide finish that provides a lustrous black, long-lasting finish on Zinc products. Penetrates directly into the metal to eliminate the danger of chipping or flaking.

THE *Puritan*
MANUFACTURING COMPANY
WATERBURY, CONNECTICUT

Wyandotte Chemicals Adds to Cleveland-Chicago Service Forces

Stephen O. Johnson

Stephen O. Johnson and *Robert K. Tucker* are new additions to *Wyandotte Chemicals Industrial Department* service forces in the company's Cleveland and Chicago territories.

Robert K. Tucker

Both new Wyandotte representatives were given intensive training by the Technical Service Department at the home office laboratories at Wyandotte, Mich., and "refresher" courses in several sales territories. Mr. Johnson studied at University of Michigan and graduated as a chemical engineer from Tri-State College of Indiana. He joined the Wyandotte Chemicals Research Department early in 1942. Mr. Tucker is a graduate in chemistry from Albion College of Michigan. He completed his studies follow-

CUT DOWN REJECTS
WITH
ORVUS
IN YOUR METAL CLEANING BATHS

You'll find this synthetic detergent effective
—as a wetting agent
—as an emulsifier
—in dispersing lime soaps which might cause poor plating if allowed to deposit on the metal
—in helping to reduce pitting in subsequent plating baths.

Write for further information about Orvus to

PROCTER & GAMBLE, Cincinnati 2, Ohio

Custom-Built
TANKS
For Cleaning, Pickling and Plating

● For 39 years leading manufacturers have relied on Kirk & Blum for custom-built tanks to meet their individual production requirements.

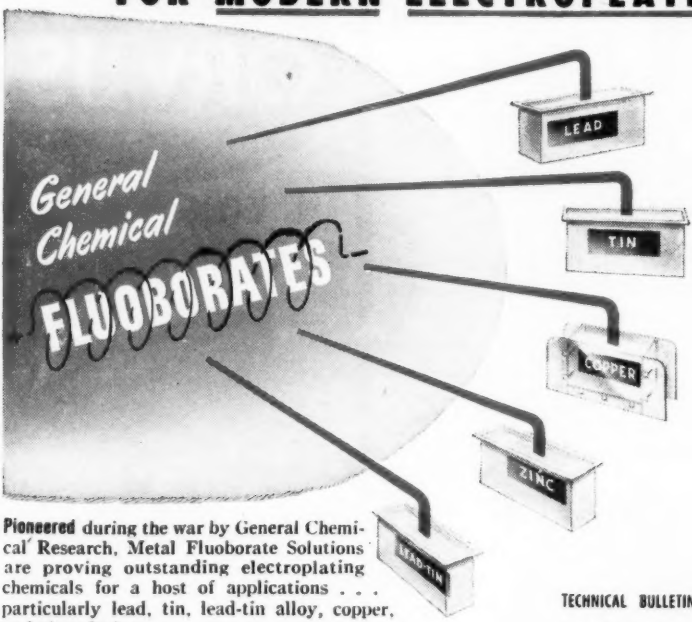
We are equipped to fabricate tanks of Steel, Lead- or Rubber Lined, Monel Metal, Stainless Steel, Copper, Aluminum, Inconel, etc.

Tanks are supplied with or without exhaust ducts and fans as conditions or specifications indicate.

KIRK AND BLUM
The KIRK & BLUM Mfg. Co.
2887 Spring Grove Ave.
Cincinnati 25, Ohio

NEW DEVELOPMENTS

FOR MODERN ELECTROPLATING!



Pioneered during the war by General Chemical Research, Metal Fluoborate Solutions are proving outstanding electroplating chemicals for a host of applications . . . particularly lead, tin, lead-tin alloy, copper, and zinc plating.

The Metal Fluoborates offer electroplaters a combination of features long desired but hitherto unobtainable in other plating agents:

1. Supplied in concentrated solution form . . . no mixing or dissolving necessary.
2. Simplicity of bath preparation.
3. Stability of bath composition.
4. Ease of control.
5. Practically 100% anode and cathode efficiency.
6. High conductivity.
7. Good covering power.
8. Fine grained deposits of good color.
9. High speed operation.

Learn more about these new developments for modern electroplating without delay! Experimental samples are available from General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y. As always, General Chemical's skilled technical servicemen are ready to give you complete details and every help in preparing for trial or full-scale runs.

GENERAL CHEMICAL COMPANY

40 Rector Street, New York 6, N. Y.

Sales and Technical Service Offices in principal cities from coast to coast

TECHNICAL BULLETINS AVAILABLE

Metal Fluoborates Bulletin 1015-A—General information on Metal Fluoborates, plus specific operating data on plating with Lead, Tin, and Cadmium Fluoborate.

Technical Information Manual ZF-1—The New Approach to Zinc Plating.

Technical Information Manual LTF-1—Lead-Tin Alloy Plating from the Fluoborate Bath.

Technical Information Manual CF-1—Copper Fluoborate.

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

ing 3½ years in the U. S. Army which finally led to occupation duty in Tokyo. He joined Wyandotte Chemicals in February of this year.

Bart-Messing Moves Activities

Mr. Morris M. Messing, president of *Bart-Messing Corporation*, announces the consolidation of its New York office and warehouse in the new manufacturing plant at 45 Morgan Avenue, Brooklyn 6, N. Y.

A new line of Selenium Rectifiers, called "*Sel-Rex*", has been introduced, incorporating many improvements and additions—some exclusively Bart-Messing developments. The engineering department is geared to build custom-made units to specifications or original design.

Bart-Messing is maintaining, in addition to the manufacturing plant, a special research department to assist electroplating plants. Electroplating managers are invited to submit their problems.

Chemical Corporation Pennsalt Distributor

The Chemical Corporation, Springfield, Mass., has been appointed distributor of *Pennsalt Cleaners*, manufactured by *Pennsylvania Salt Company*, in the Rhode Island and Eastern Massachusetts region, according to an announcement by *Mr. E. T. Manley*, president of the Chemical Corporation.

Mr. Leo Arsenault, who recently joined Chemical, will represent the company in the aforesaid territory.

Blow-Off Gun

Made of high strength aluminum, the "*Bully*" *Blow Gun*, manufactured by *Superior Manufacturing Company*, 970 Public

A RECTIFIER *for* EACH TANK

Better Work... Lower Costs

Greater flexibility in handling varying jobs from tank to tank is assured by the installation of an R-A Selenium Rectifier for each tank. The finest voltage settings for the most difficult job in each tank can be set without overall loss of power. The complete installation is economical too.

Richardson-Allen Selenium Rectifiers are a great advancement in current conversion, engineered and built for long hard service. All units are tested at 25% continuous overload before leaving the factory.

Standard units available for immediate delivery. Write us today for data bulletins and the name of your nearest dealer. He will be glad to give you comparative cost figures on installation and operation.

Consider These Advantages:

1. Continuously variable stepless voltage control sealed in oil.
2. No lag in starting.
3. Adaptable for remote control.
4. Constant efficiency with varying loads.
5. No standby losses when not under load.
6. Internal forced cooling.
7. Thermostatic protection.
8. Units operate in room temperature up to 105° F.
9. Switches and pilot light on both basic and remote control units.

Rectification for Every Application

RICHARDSON-ALLEN CORP.
15 WEST 20th STREET, NEW YORK 11, N. Y.
Sales Engineers Located in Principal Cities
Manufacturers of the most complete line of standard Selenium Rectifiers

RICHARDSON-ALLEN
Selenium Rectifiers

Now! Zapon Duranite-

...A Really New Finish

TESTS TO DATE SHOW THE FOLLOWING PROPERTIES:

Superior soap resistance, still going after 1080 h in 3% Gold Dust at 120° F.

Superior humidity resistance, still going after 1 hours, 120° F. saturated.

Superior salt spray resistance, still going after 1 hours, 20% sodium chloride at 95° F.

Superior hardness, 5H to 6H pencil test.

Superior acid resistance, no effect from acetic, c oleic, lactic acids.

Superior grease resistance, no effect from vegeta animal, petroleum greases.

THE DURANITE family of tough, fast-baking finishes has served the metal-finishing industry with distinction for a dozen years. It was among the very first in the field to provide faster production properties combined with the abrasion and chemical resistance so necessary in modern metal finishing.

Now we offer another member — Duranite-H — made from an entirely new resin base which provides the new, highly desirable properties shown above. Let us show you how Duranite-H will prove your finishing.

Write, wire or phone for quick service. Za Division, Atlas Powder Company, New York C Stamford, Conn., and North Chicago, Ill.

ZAPON

REG. U. S. PAT. OFF.

zapon production finish

Square Building, Cleveland 13, Ohio, is strong, yet light in weight so that it does not become tiresome to handle. It has no stuffing box, discs, or springs and is claimed to be leakproof. A hanger bar at the top permits it to be hung out of the way when not in use.

A regulating trigger gives the gun a fully controllable air flow. A slight pressure on the trigger releases a gentle flow of air; more pressure produces a stronger flow, and full depression of the trigger produces a full blast.

Air connection is for standard ¼-inch pipe thread; weight is approximately 10 ounces.

Preparation of Aluminum Prior to Organic Finishing

A phosphate-type conditioning treatment for removing light soils and preparing aluminum surfaces for painting and other organic finishing is described in a 4-page service report issued by *Oakite Products, Inc.*

This phosphatizing treatment provided by *Oakite Compound No. 36* also retards corrosion of the metal under the paint coats, should they become accidentally scratched or damaged.

It may be applied by metal washing, still tank or hand wiping methods, depending upon the size and shape of the aluminum parts, the volume of production required, and the equipment available. Free service report providing full particulars may be obtained by addressing Oakite Products, Inc., 40 Thames Street, New York 6, N. Y.

New Contact Wheels for Abrasive Belt Polishing

Improved *Neoprene Contact Wheels* of special design are made in a wide range of densities and sizes. The various densities adapt abrasive belt polishing to a much greater variety of work than ever before.

Copy of *Presto Bulletin 105* is mailed promptly on request to the *Manberscheid Company*, Dept. 102, 810 Fulton Street, Chicago 7, Ill.

Diversey Offers New Soak Cleaner

The Diversey Corporation, Chicago, has recently introduced a new type heavy duty non-caustic soak cleaner, *Diversey No. 99*,

Headquarters
for
Buffs—Cleaners
Buffing Compositions
Nickel Anodes
Chemicals
General Supplies
Equipment
•
JACOB HAY CO.
(NOT INC.)
4014 WEST PARKER AVENUE
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For Sale
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Slightly Used
BUFFS
LOOSE & SEWED
ANY QUANTITY
ALL SIZES
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Michigan Buff Co., Inc.
4054 BEAUFAIT AVE.
DETROIT (7) MICHIGAN

—for better results in preparing the surface of metal for final finish

PERMAG Compounds clean quickly—thoroughly—economically.
Electroplaters have relied on PERMAG for nearly 25 years. It always does a perfect cleaning job.
Details on request

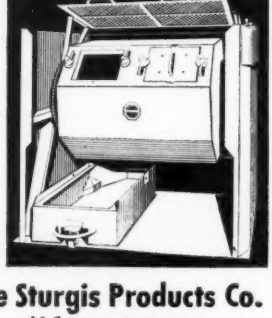
Magnuson Products Corp.
50 Court St. Brooklyn 2, N. Y.
In Canada: Canadian PERMAG Products, Ltd.
Montreal—Toronto

ROTO-FINISH!

PARTS MECHANICALLY CUT LABOR COSTS

Produce semi-lustrous finish on stampings, machined parts, die castings, forgings, extrusions for automotive, building, plumbing, appliance, general hardware, fishing tackle, tools, business machines.

Saves Time!



ROTO FINISH

The Sturgis Products Co.
411 Jacob Street
STURGIS, MICHIGAN

which is claimed to eliminate many solvent pre-soak and hand-wipe operations.

It is especially designed for cleaning of iron, steel, copper, brass, magnesium and zinc alloys. Being free from caustic soda, it is said to be very popular with workers.

Literature and complete information is available by writing to *The Diversey Corporation*, 53 W. Jackson Boulevard, Chicago 4, Ill.

Vertical Belt Grinder

Two-roll vertical abrasive belt grinding and polishing machines have been recently introduced for polishing of ferrous and non-ferrous sheet and strip. Machines are built in a progression of widths up to a maximum of 60 inches. Endless coated belts 10 feet 6 inches long are utilized on all grinding and polishing units and this short belt has definite economical advantages over 20 feet 3 inch belts used on previous models. Both the plate and strip type machines are designed or can be adapted for multi-stage processing whereby a group or battery of machines is placed in series for continuous polishing. Complete data will be supplied to all production men on request to *The Hill Acme Company*, 6441 Breakwater Avenue, N. W., Cleveland 2, Ohio.

Adjustable Abrasive Belt Grinder

This utility grinder, which is adjustable 90 degrees, features an abrasive belt operating over a resilient contact roll or wheel, thereby reducing grinding wear on the roll and allowing it to remain flat, square at corner or side and to maintain its diameter and balance. Resiliency of roll eliminates chatter.

For grinding contours, following a pattern, grinding or cleaning up in inaccessible places, work may be done on the unsupported belt. For intricate patterns, belt may be scived about ¼ inch, allowing bare cloth to act as lead to guide belt around sharp corners and the remaining abrasive grinds. *Porter-Cable Machine Company*, 1715 N. Salina Street, Syracuse 8, N. Y., is the manufacturer.

One-Piece Neoprene Suit

The *One-Piece Neoprene Suit* will find ultimate use in work involving acids, oil, and other harmful chemical compounds. It is

made of coated neoprene material with fully vulcanized seams (a hood type of mask is available), constructed with a heavy duty, full length zipper, stand-up collar, and corduroy tipped cuffs. An overlapping front gives added protection when zipper is closed. The sleeves are fitted with gum neoprene cuffs to insure a snug fit on the wrists. Available in three size ranges. Prices and complete details supplied on request by *Industrial Products Company*, 2813 N. 4th Street, Philadelphia 33, Pa.

Technical Data Folder on High Solids Vinylites

Complete technical data on *The Watson-Standard Company's* series of *High Solids Vinyl Resins*, technical coatings for cans, closures, containers, toys and a variety of other materials, is available in a *Technical Data Folder* published by the manufacturer.

For complete information write for the Technical Data Folder on High Solids Vinylites, The Watson-Standard Company, 225 Galveston Avenue, Pittsburgh, Pa.

Plating Rack Manual

A 100-page "*Plating Rack Manual*" by *William E. Belke, Belke Manufacturing Company*, 947 N. Cicero Avenue, Chicago 51, Ill., covers various aspects of plating racks, their use, design, construction, etc. Such incidental matters as racking small parts, making anodizing racks, positioning difficult articles for plating, use of auxiliary anodes and burning bars, etc., are also adequately treated. A wide array of illustrations (144 pictures) shows actual production-proved methods, and 30 full-page plates exhibit products made by the company for use in plating. Price, $5.00.

New Bench Polisher Backstand

A new *No. 52 Bench Backstand*, which converts visiting bench wheel grinders into high production abrasive belt units for grinding, deburring and finishing, has been announced by *Hammond Machinery Builders, Inc.*, Dept. GP-10, Kalamazoo, Mich.

Bulletin No. 316, which may be had by writing to the above address, describes the features of the unit and the several advantages in speed and quality resulting from its use.

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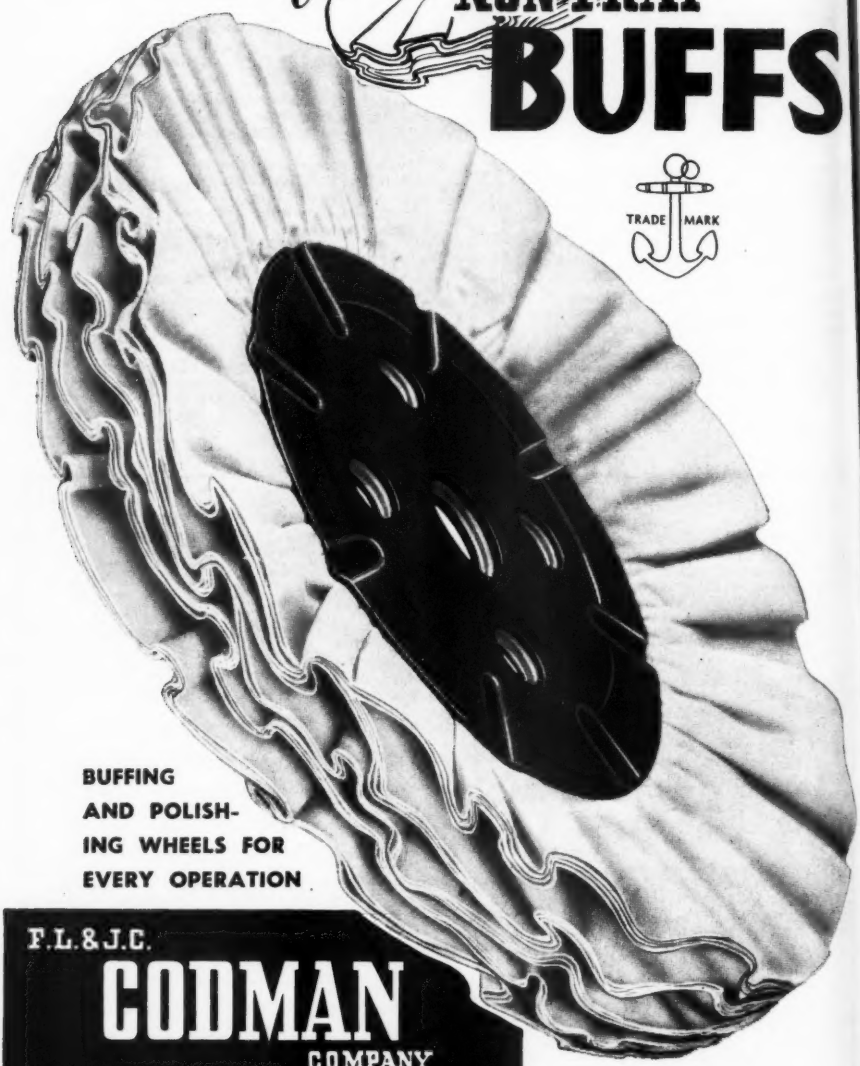

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October 1, 1947

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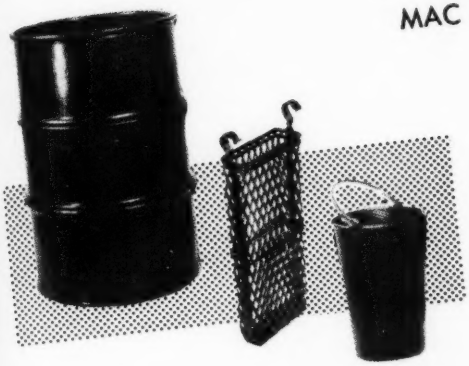

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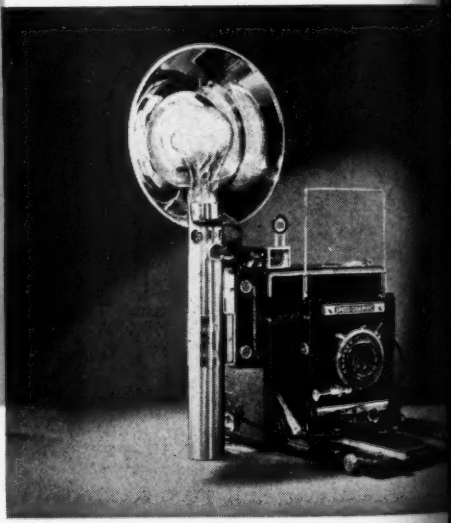

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